

Woodstock

Hazard Mitigation

Plan

Update 2020



This plan integrates the following:

- **Hazard Mitigation Plan Update (FEMA)**
- **Community Wildfire Protection Plan (DNCR)**

December 8, 2020
Final for Town Adoption

**Prepared for the Town of Woodstock and NH Homeland Security
& Emergency Management**

By
The Woodstock Planning Team

With assistance from Mapping and Planning Solutions

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“Plans are worthless, but planning is everything. There is a very great distinction because when you are planning for an emergency you must start with this one thing: The very definition of “emergency” is that it is unexpected, therefore it is not going to happen the way you are planning.”

-Dwight D. Eisenhower

HAZARD MITIGATION PLAN DEFINITIONS

“A natural hazard is a source of harm or difficulty created by a meteorological, environmental, or geological event.”

“Hazard mitigation is any sustained action taken to reduce or eliminate the long-term risk to human life and property from hazards (44CFR 201.2) Hazard mitigation activities may be implemented prior to, during, or after an event. However, it has been demonstrated that hazard mitigation is most effective when based on an inclusive, comprehensive, long-term plan that is developed before a disaster occurs.”

(Source: Local Mitigation Plan Review Guide, FEMA, October 1, 2011)



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Cover Photo: Woodstock Town Hall

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Acknowledgments

This plan integrates elements to qualify it as a Community Wildfire Protection Plan (CWPP), according to the US Forest Service and the NH Department of Natural & Cultural Resources (DNCR). The plan was created through a grant from NH Homeland Security & Emergency Management (HSEM). The following organizations have contributed invaluable assistance and support for this project:

- NH Homeland Security & Emergency Management (HSEM)
- NH Office of Strategic Initiatives (OSI)
- Federal Emergency Management Agency (FEMA)
- Mapping and Planning Solutions (MAPS)
- NH Forests & Lands (DNCR)

This plan is an update to the prior Groton Hazard Mitigation Plan, approved on October 6, 2014.

Approval Notification Dates for 2020 Update

Approved Pending Adoption (APA):..... December 8, 2020

Jurisdiction Adoption: _____, _____

CWPP Approval: _____, _____

Plan Approval Date (HSEM): _____, _____

Receipt of FEMA Letter _____, _____

Plan Distribution (MAPS):..... _____, _____

TOWN OF WOODSTOCK HAZARD MITIGATION PLANNING TEAM (HMPT)

The Town of Woodstock would like to thank the following people for the time and effort spent to complete this plan. The following people have attended meetings or been instrumental in completing this plan:

- Ryan OlesonWoodstock Police Chief & EMD
- Mark Gagnon.....Woodstock Police Officer
- Kevin MillarWoodstock Deputy EMD
- Angel EkstromCentral NH PHN
- Gil RandWoodstock Select Board
- Jennifer GilbertNH OSI
- Mike WelchWoodstock Director of DPW
- John Neely.....US Forest Service
- Patrick Griffin.....Linwood Ambulance
- Kayla HendersonNH HSEM
- Judy WelchWoodstock Executive Assistant
- Paul Hatch.....NH HSEM
- Chad Morris.....Lincoln Police Chief & EMD
- June Garneau.....MAPS
- Doug MoorheadCitizen & Police Chief (former)
- Olin GarneauMAPS
- Cheryl Bourassa.....Administrative Assistant

Many thanks for all the hard work and effort given by each one of you. This plan would not exist without your knowledge and experience. The Town of Woodstock also thanks the Federal Emergency Management Agency and NH Homeland Security & Emergency Management as the primary funding sources for this plan.

Acronyms associated with the above list:

- DPW Department of Public Works
 EMD Emergency Management Director
 PHN..... Public Health Network

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Executive Summary

The Woodstock Hazard Mitigation Plan Update 2020 was compiled to assist the Town of Woodstock in reducing and mitigating future losses from natural, technological or human-caused hazardous events. The plan was developed by participants of the Woodstock Hazard Mitigation Planning Team (HMPT), interested stakeholders, the general public and Mapping and Planning Solutions (MAPS). The plan contains the tools necessary to identify specific hazards and aspects of existing and future mitigation efforts.



This plan is an **update** to the 2014 Woodstock Hazard Mitigation Plan. To produce an accurate and current planning document, the planning team used the 2014 plan as a foundation, building upon that plan to provide more timely information.

Mitigation action items for natural hazards are the main focus of this plan. However, in addition to natural hazards, this plan addresses technological and human-caused hazards, as shown below.

NATURAL HAZARDS

- | | |
|--------------------------------------|-------------------------|
| 1) Inland Flooding | 7) Lightning |
| 2) Severe Winter Weather | 8) Earthquakes |
| 3) Extreme Temperatures | 9) Infectious Diseases |
| 4) Tropical & Post-Tropical Cyclones | 10) Landslide & Erosion |
| 5) High Wind Events | 11) Drought |
| 6) Wildfires | |

TECHNOLOGICAL HAZARDS

- | | |
|-----------------------------|-------------------------|
| 1) Conflagration | 4) Aging Infrastructure |
| 2) Long Term Utility Outage | 5) Dam Failure |
| 3) Hazardous Materials | |

HUMAN-CAUSED HAZARDS

- | | |
|----------------------------|-------------------------|
| 1) Transport Accidents | 3) Cyber Events |
| 2) Mass Casualty Incidents | 4) Terrorism & Violence |

Some hazards that are listed in the 2018 New Hampshire Hazard Mitigation Plan were not included in this plan as the team felt they were unlikely to occur in Woodstock or not applicable. Omitted hazards can be seen in Chapter 3, Section A, along with an explanation of why they are not included in this plan.

This plan also provides a list of Critical Infrastructure & Key Resources (CIKR) categorized as follows: Emergency Response Facilities (ERF), Non-Emergency Response Facilities (NERF), Facilities and Populations to Protect (FPP) and Potential Resources (PR). Also, this plan addresses the town’s involvement in the National Flood Insurance Program (NFIP).

Some communities, when faced with an array of hazards, can cope with the impact of these hazards adequately. For example, although severe winter weather is often a common hazard in New Hampshire and more often than not considered to be the most likely to occur, most New Hampshire communities handle two to three-foot snowstorms with little or no disruption of services. On the other hand, an unexpected ice storm can have disastrous effects on a community. Mitigation for this type of sudden storm is difficult to achieve: establishing warming and cooling centers, establishing notification systems, providing public outreach, tree trimming, opening shelters and perhaps burying overhead power lines are just a few of the action items that may be put in place.

In summary, finding mitigation action items for every hazard that affects a community is, at times, challenging. Also, with today’s economic constraints, cities and towns are less likely to have the financial ability to complete some mitigation action items, such as burying power lines. In preparing this plan, the Woodstock HMPT has considered a comprehensive list of mitigation action items that could diminish the impact of hazards but has also decided to maintain a list of preparedness action items for future reference and action.

To simplify the language in the plan, the following abbreviations and acronyms will be used:

Woodstock Hazard Mitigation Plan Update 2020	the plan or this plan
Woodstock	the town or the community
Hazard Mitigation Planning Team.....	the team or HMPT
Hazard Mitigation Plan.....	HMP
Emergency Operations Plan	EOP
Mapping and Planning Solutions	MAPS
Mapping and Planning Solutions Planner.....	the planner
NH Homeland Security & Emergency Management	HSEM
Federal Emergency Management Agency	FEMA

For more acronyms, please refer to Appendix E: Acronyms

Mission Statement:
 To make Woodstock less vulnerable to the effects of hazards through the effective administration of hazard mitigation planning, wildfire hazard assessments, and a coordinated approach to mitigation policy and planning activities.

Vision Statement:
 The Town of Woodstock will reduce the impacts of natural hazards and other potential disasters through implementing mitigation measures, public education and deliberate capital expenditures within the community. Homes and businesses will be safer and the community’s ISO rating may be improved.

Chapter 1: Hazard Mitigation Planning Process

A. AUTHORITY & FUNDING

The Woodstock Hazard Mitigation Plan Update 2020, was prepared per the Disaster Mitigation Act of 2000 (DMA), Section 322 Mitigation Planning, signed into law by President Clinton on October 30, 2000. This hazard mitigation plan was prepared by the Woodstock Hazard Mitigation Planning Team (HMPT) under contract with New Hampshire Homeland Security & Emergency Management (HSEM) operating under the guidance of Section 206.405 of 44 CFR Chapter 1 (10-1-97 Edition) and with the assistance and professional services of Mapping and Planning Solutions (MAPS). HSEM funded this plan through grants from the Federal Emergency Management Agency (FEMA). Matching funds for team members' time were also part of the funding formula.

B. PURPOSE & HISTORY OF THE FEMA MITIGATION PLANNING PROCESS

The ultimate purpose of the Disaster Mitigation Act of 2000 (DMA) is to:

"...establish a national disaster hazard mitigation program -

- *To reduce the loss of life and property, human suffering, economic disruption and disaster assistance costs resulting from natural disasters; and*
- *To provide a source of pre-disaster hazard mitigation funding that will assist States and local governments (including Indian tribes) in implementing effective hazard mitigation measures that are designed to ensure the continued functionality of critical services and facilities after a natural disaster".¹*

DMA 2000 amends the Robert T. Stafford Disaster Relief and Emergency Assistance Act by, among other things, adding a new section "322 – Mitigation Planning" which states:

"As a condition of receipt of an increased Federal share for hazard mitigation measures under subsection (e), a State, local, or tribal government shall develop and submit for approval to the President a mitigation plan that outlines processes for identifying the natural hazards, risks, and vulnerabilities of the area under the jurisdiction of the government."²

HSEM's goal is to have all New Hampshire communities complete a local hazard mitigation plan as a means to reduce future losses from natural hazards before they occur. HSEM outlined a process whereby communities throughout the state may be eligible for grants and other assistance upon completion of this hazard mitigation plan.

The Woodstock Hazard Mitigation Plan Update 2020 is a planning tool to use to reduce future losses from natural, technological and human-caused hazards as required by the Disaster Mitigation Act of 2000. This plan does not constitute a section of the town's Master Plan. However, mitigation action items from this plan may be incorporated into future Master Plan updates.

The DMA places emphasis on local mitigation planning. It requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans as a condition for receiving Hazard Mitigation Grant Program (HMGP) project grants. Local governments must review this plan yearly and update this plan every five years to continue program eligibility.

¹ Disaster Mitigation Act (DMA) of 2000, Section 101, b1 & b2

² Disaster Mitigation Act (DMA) of 2000, Section 322a

C. JURISDICTION

This plan addresses one jurisdiction – the Town of Woodstock, NH.

D. SCOPE OF THE PLAN & FEDERAL & STATE PARTICIPATION

A community's hazard mitigation plan often identifies a vast number of natural hazards and is somewhat broad in scope and outline. The scope and effects of this plan were assessed based on the impact of hazards and wildfire on *Critical Infrastructure & Key Resources (CIKR)*, *current residential buildings*, *other structures within the town*, *future development*, *administrative*, *technical and physical capacity of emergency response services and response coordination between federal, state and local entities*.

In seeking approval as a Hazard Mitigation Plan and a Community Wildfire Protection Plan (CWPP), the planning effort included participation of NH Homeland Security & Emergency Management (HSEM), the United States Department of Agriculture-Forest Service (USDA-FS), the NH Department of Natural & Cultural Resources (DNCR), and the NH Office of Strategic Initiatives (OSI) as well as routine notification of upcoming meetings to state and federal entities above. Designation as a CWPP may allow a community to gain access to federal funding for hazardous fuels reduction and other mitigation projects supported by the USDA-FS. By merging the two federal planning processes (hazard and wildfire), duplication is eliminated, and the town has access to a larger pool of resources for pre-disaster planning.

The Healthy Forest Restoration Act (HFRA) of 2003 includes statutory incentives for the US Forest Service to consider local communities as they develop and implement forest management and hazardous fuel reduction projects. For a community to take advantage of this opportunity, it must first prepare a CWPP. This hazard mitigation planning process not only satisfies FEMA's criteria regarding wildfires and all other hazards but also addresses the minimum requirements for a CWPP:

- **Collaboration:** *A CWPP must be collaboratively developed by local and state government representatives, in consultation with federal agencies and other interested parties.*
- **Prioritized Fuel Reduction:** *A CWPP must identify and prioritize areas for hazardous fuel reduction treatments and recommend the types and methods of treatment that will protect one or more at-risk communities and essential infrastructure.*
- **Treatment of Structural Ignitability:** *A CWPP must recommend measures that homeowners and communities can take to reduce the ignitability of structures throughout the area addressed by the plan.*³

Finally, as required under the Code of Federal Regulations (CFR), Title 44, Part 201.6(c) (2) (ii) and 201.6(c) (3) (ii), the plan must address the community's participation in the National Flood Insurance Program (NFIP) and its continued compliance with the program. Also, as part of vulnerability assessment, the plan must address the NFIP insured structures that have been repetitively damaged due to floods.

³ Healthy Forest Restoration Act; HR 1904, 2003; Section 101-3-a.b.c; http://frwebgate.access.gpo.gov/cgi-bin/getdoc.cgi?dbname=108_cong_bills&docid=f:h1904enr.txt.pdf

E. PUBLIC & STAKEHOLDER INVOLVEMENT

Public and stakeholder involvement was stressed during the initial meeting, and community officials were given a matrix of potential team members (page 19). Community officials were urged to contact as many people as they could to participate in the planning process, including not only residents but also officials and residents from surrounding communities. The Town of Woodstock understands that natural hazards do not recognize political boundaries.

Woodstock is part of the Lincoln-Woodstock Cooperative School District, SAU 68. All Woodstock students (grades K-12) attend school in Lincoln. Members of the Lincoln-Woodstock School District were invited to the meetings, but due to busy schedule conflicts, there were no representatives from the school present.

The team provided excellent public and stakeholder notification. Many interested citizens and stakeholders had the opportunity to become aware of the hazard mitigation planning taking place in Woodstock. A press release (see right) was posted at several locations in the community and on the town’s website (see below). Meeting dates were also posted on the town’s website (see the following page for a few examples of these postings).

News

- [Sample Ballot - March 12, 2019 - Town Election](#)
- [PUBLIC NOTICE - Pre-Election Testing Of Electronic Ballots](#)
- [2019 WARRANT](#)
- [PRESS RELEASE - HAZARD MITIGATION PLANNING](#)
- [SUPERVISOR'S OF THE CHECKLIST SESSION](#)

[View all](#)

*Mapping and Planning Solutions
105 Union Street, Suite 1
Whitefield, NH 03598*

Press Release

FOR IMMEDIATE RELEASE
Updated: February, 2019

Contact: June Garneau
603-837-7122

**TOWN OF WOODSTOCK COMMENCES
HAZARD MITIGATION PLANNING**

The Emergency Management Director of the Town of Woodstock recently met with June Garneau, of Mapping and Planning Solutions and other Team members from Woodstock, to begin work on the required five-year update to the **2014 Woodstock Hazard Mitigation Plan**. As a result of this meeting, Mapping and Planning Solutions is conducting a series of meetings on the Hazard Mitigation Plan over the next few months.

Through this series of public meetings, the Team will address issues such as flooding, hurricanes, drought, landslides and wildfires, and determine efforts the Town can undertake to mitigate the effects of both natural and human-caused hazards. The Team will also examine potential shelter sites and the need for generators at those sites.

By examining critical infrastructure and key resources, along with past hazards, the team will establish priorities for future mitigation projects and steps that can be taken to increase public awareness of hazards in general.

As mandated by the Disaster Mitigation Act of 2000, all municipalities are required to complete a local Hazard Mitigation Plan in order to qualify for Federal Emergency Management Administration funding should a natural disaster occur. The planning processes are made possible by grants from FEMA.

The Hazard Mitigation Planning Team is currently being formed; Woodstock citizens and any interested stakeholders are invited to participate. All interested parties should contact Ryan Oleson, the Woodstock Emergency Management Director, at 745-8700 if they wish to be included in the process.

The next meeting is scheduled for **Wednesday, March 20** from **9:00-11:00 AM** at the Woodstock Town Offices. The general public is encouraged to attend all meetings, regardless of whether they are a part of the Planning Team.

More information on the hazard mitigation planning process is available from June Garneau at Mapping and Planning Solutions, 603-837-7122.

March 2019

Filter by Type: Department/Board/Committee:

Sun	Mon	Tue	Wed
24	25	26	27
3	4	5 Selectmen's Meeting 6:00pm	6
10	11 Planning Board Meeting 6:30pm	12 TOWN OFFICE CLOSED - TOWN ELECTION & MEETING	13
17			20 Hazard Mitigation Planning 9:00am to 11:00am

April 2019

Filter by Type: Department/Board/Committee:

Sun	Mon	Tue	Wed
31	1	2 Selectmen's Meeting 6:00pm	3
7 Planning Board Meeting 6:30pm	8	9	10 Hazard Mitigation Planning 9:00am to 11:00am
14	15	16 Selectmen's Meeting 6:00pm	17
21	22	23	24
28	29	30 Selectmen's Meeting 6:00pm	1

May 2019

Filter by Type: Department/Board/Committee:

Sun	Mon	Tue	Wed
28	29	30	1
5	6	7	8 Hazard Mitigation Planning 9:00am to 11:00am
12 Planning Board Meeting 6:30pm	13 Selectmen's Meeting 6:00pm	14 Selectmen's Meeting 6:00pm	15
19	20	21	22
26	27	28 Selectmen's Meeting 6:00pm	29

Lastly, the planner sent a monthly calendar to NH EMDs, Police Chiefs, Fire Chiefs, Rangers and other state, federal and private officials, including stake-holders for the town (example is shown below).



Upcoming Meetings

(Highlighted by "Counties" as of April 22, 2019)



Day	Date	Time	Town/Location	Plan Type	JSEM Field Rep	County
Tuesday	4/23/19	10:00 AM	Greenfield Fire Station	HMP	Liz Gilboy	Hillsboro
Thursday	4/25/19	6:30 PM	Jefferson Town Offices	EOP	Heidi Lawton	Coos
Monday	4/29/19	1:00 PM	Jackson Town Offices	HMP	Heidi Lawton	Carroll
Wednesday	5/1/19	9:00 AM	Waterville Valley Town Offices	HMP	Paul Hatch	Grafton
Wednesday	5/1/19	1:00 PM	Campton Town Offices	HMP	Paul Hatch	Grafton
Thursday	5/2/19	2:00 PM	Conway Fire Station	HMP	Heidi Lawton	Carroll
Monday	5/6/19	6:00 PM	Lisbon Fire Station	EOP	Paul Hatch	Grafton
Tuesday	5/7/19	4:00 PM	Groton Town Offices	HMP	Paul Hatch	Grafton
Wednesday	5/8/19	9:00 AM	Woodstock Town Offices	HMP	Paul Hatch	Grafton
Wednesday	5/8/19	3:00 PM	Shelburne Town Offices	EOP	Heidi Lawton	Coos

It was noted that team composition is expected to be lower in smaller communities because of the small population base and the fact that many people “wear more than one hat”. It is often very difficult to attract individual citizens to participate in town government, and those that do generally hold full-time jobs and work as volunteers in a variety of town positions. With small populations, the percent of interested citizens in a town’s planning processes is extremely small. Due to the availability of jobs and other economic factors, the town has a relatively high elderly population and a dwindling amount of young people with an interest in politics.

Woodstock had excellent participation in the development of this plan. In addition to the Emergency Management Director (EMD) and the Assistant EMD, members of the Woodstock Police and DPW participated in meetings along with the Police Chief/EMD from Lincoln. The Executive Assistant, the Administrative Assistant, a member of the Select Board and a member of the local ambulance, also took part in meetings. Lastly, one interested citizen took the opportunity to attend several meetings. Comments made by all team members, including the citizen of the community who attended, were integrated into the narrative discussion and were incorporated into the essence of the document.

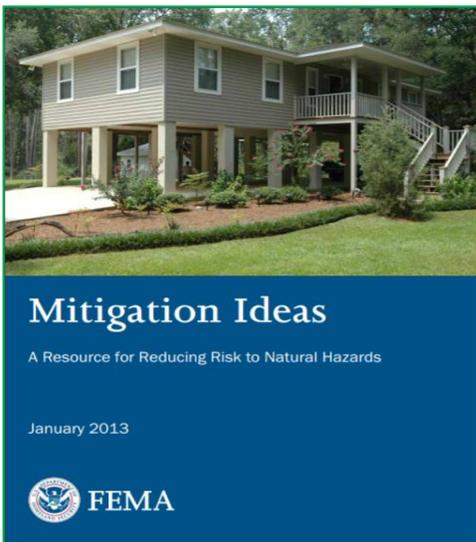
§201.6(b) requires that there be an open public involvement process in the formation of a plan. This process shall provide an opportunity for the public to comment on the plan during its formation as well as an opportunity for any neighboring communities, businesses, and others to review any existing plans, studies, reports, and technical information and incorporation of those in the plan, to assist in the development of a comprehensive approach to reducing losses from natural disasters.

F. INCORPORATION OF EXISTING PLANS, STUDIES, REPORTS AND TECHNICAL INFORMATION

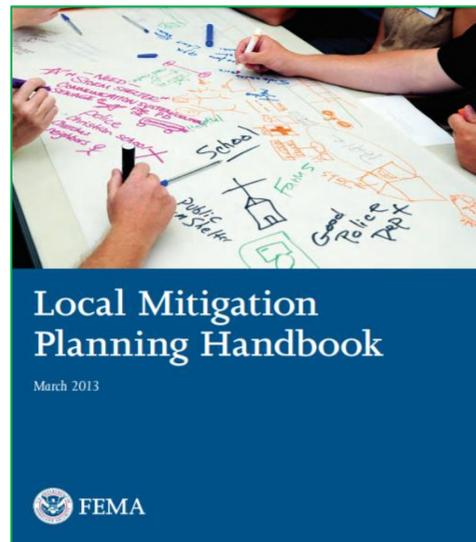
The planning process included a complete review of the Woodstock Hazard Mitigation Plan of 2014 for updates, development changes and accomplishments. Also, as noted in the bibliography and footnotes located throughout the plan, many other documents were used to create this mitigation plan. Some, but not all, of those plans and documents are listed as follows:

The Woodstock Hazard Mitigation Plan of 2014.....	Compare & Contrast
Woodstock Master Plan (2014).....	Community Information
Woodstock Annual Report (2019).....	Fire Report & Development
Other Hazard Mitigation Plans (Groton, Randolph, Kingston).....	Formats & Mitigation Ideas
The Woodstock Ordinance Subdivision Regulations (2011)	New Development Regulations
Flood Plain Development Ordinance (2014).....	Floodplain Regulations
Census 2010 Data	Population Data
The NH DRA Summary of Inventory of Valuation MS-1 2019 for Woodstock.....	Structure Evaluation
The Economic & Labor Market Information Bureau Community Profile	Population Trends
The American Community Survey (ACS 2013-2017)	Population Trends
Mitigation Ideas, FEMA, January 2013	Mitigation Strategies
The Department of Cultural & Natural Resources (DNCR)	DNCR Fire Report
The NH Office of Strategic Initiatives (OSI)	Flood Losses
The NH Department of Revenue	Property Information

Other technical manuals, federal and state laws, as well as research data, were combined with these elements to produce this integrated hazard mitigation plan. Please refer to the Bibliography in *Appendix A: Bibliography* and the plan’s footnotes.



<https://www.fema.gov/media-library/assets/documents/30627>



<https://www.fema.gov/media-library/assets/documents/31598>

G. HAZARD MITIGATION GOALS

Before identifying new mitigation action items, the team reviewed and agreed to the goals in the State of New Hampshire Multi-Hazard Mitigation Plan, Update 2018. These goals are detailed below.

OVERARCHING GOALS

The following are the five overarching goals of this plan:

- *Minimize loss and disruption of human life, property, the environment and the economy due to natural, technological and human-caused hazards through a coordinated and collaborative effort between federal, state and local authorities to implement appropriate hazard mitigation measures.*
- *Enhance the protection of the general population, citizens and guests of the community before, during and after a hazard event through public education about disaster preparedness and resilience and expanded awareness of the threats and hazards which face the community.*
- *Promote continued comprehensive hazard mitigation planning at local levels to identify, introduce and implement cost-effective hazard mitigation measures.*
- *Address the challenges posed by climate change as they pertain to increasing the risk and impacts of the hazards identified within this plan.*
- *Strengthen Continuity of Operations and Continuity of Government at the local level to ensure the continuation of essential services*

NATURAL HAZARD OBJECTIVES

- *Reduce long-term flood risks through assessment, identification and strategic mitigation of at-risk/vulnerable infrastructure (dams, stream crossings, roadways, coastal levees, etc.).*
- *Minimize illnesses and deaths related to events that present a threat to human and animal health.*
- *Assist communities with plan development, outreach and public education to reduce the impact of natural disasters.*
- *Ensure mitigation strategies consider the protection and resiliency of natural, historical and cultural resources.*

TECHNOLOGICAL HAZARD OBJECTIVES

- *Ensure technological hazards are responded to appropriately and to mitigate the effect on citizens.*
- *Build upon state and local capabilities to identify and respond to emerging contaminants.*
- *Effectively collaborate between federal, state and local agencies as well as private partners, Non-Governmental Organizations (NGOs) and Volunteer Organizations Active in Disaster (VOADs).*

- Enhance public education of technological hazards to assist in the prevention and mitigation of hazard impacts on the population.
- Ensure HAZMAT teams are adequately equipped and trained to respond, contain and mitigate incidents involving technological hazards.
- Reduce the possibility of long-term utility outages by planning, training and exercising on utility failure events.
- Lessen the effects of technological hazards on communications infrastructure by building more resilient voice and data systems.

HUMAN-CAUSED HAZARD OBJECTIVES

- Ensure that grant-related funding processes allow for sensible and practical actions to take place at the community and state level.
- Identify Critical Infrastructure & Key Resources (CIKR) risks or vulnerabilities and protect or harden infrastructure against hazards.
- Improve the ability to respond and mitigate Cyber Events through increased training, exercising, improved equipment and utilizing the latest technologies.
- Foster collaboration between federal, state and local agencies on training, exercising and preparing for mass casualty incidents and terrorism.
- Ensure that state and community assets (i.e., hospitals, state agencies, non-profits, universities, nursing homes, prisons, etc.) are prepared for all phases of emergency management, including training, reunification and exercising.

Did You Know?



On average, **\$1** spent on **HAZARD MITIGATION** provides the **NATION** approximately **\$4** IN FUTURE BENEFITS

Money spent on reducing the risk of natural hazards is a wise investment. FEMA administers three grant programs that provide funding for eligible mitigation planning and projects: the Hazard Mitigation Grant Program (HMGP), the Flood Mitigation Assistance (FMA) Program, and the Pre-Disaster Mitigation (PDM) Program.

FEMA E-Brief, April 12, 2017

H. HAZARD MITIGATION PLANNING PROCESS & METHODOLOGY

The planning process consisted of twelve specific steps; some steps were accomplished independently while other areas were interdependent. Many factors affected the ultimate sequence of the planning process, such as the number of meetings, community preparation, attendance and other community needs. The planning process resulted in significant cross-talk regarding all types of natural, technical and human-caused hazards by team members.



All steps were included but not necessarily in the numerical sequence listed. The list of steps is as follows:

PLANNING STEPS

Step 01: Team formation, orientation and goals

Step 02: Identify hazards and their risk and probability

Table 3.1 – Hazard Identification & Risk Assessment (HIRA)

Step 03: Profile and list historic and potential hazards

Table 3.2 – Historic Hazard Identification

Step 04: Profile, list, and establish risk for Critical Infrastructure & Key Resources (CIKR)

Tables 4.1 to 4.4 – Critical Infrastructure & Key Resources

Step 05: Assess the community’s participation in the National Flood Insurance Program (NFIP)

Chapter 3, Section D

Step 06: Prepare an introduction to the community, discuss emergency service capabilities and development trends and review statistical information about the town

Chapter 2, Sections A, B and C & Table 2.1, Town Statistics

Step 07: Review current plans, policies & mutual aid & brainstorm to identify improvements

Table 6.1 – Current Plans, Policies & Mutual Aid

Step 08: Examine the mitigation actions items from the last plan

Table 7.1 – Accomplishments since the last Plan

Step 09: Evaluate and categorize potential mitigation action items

Tables 8.1 - Potential Mitigation Strategies & the STAPLEE

Step 10: Prioritize mitigation action items to determine and action plan

Table 9.1 – The Mitigation Action Plan

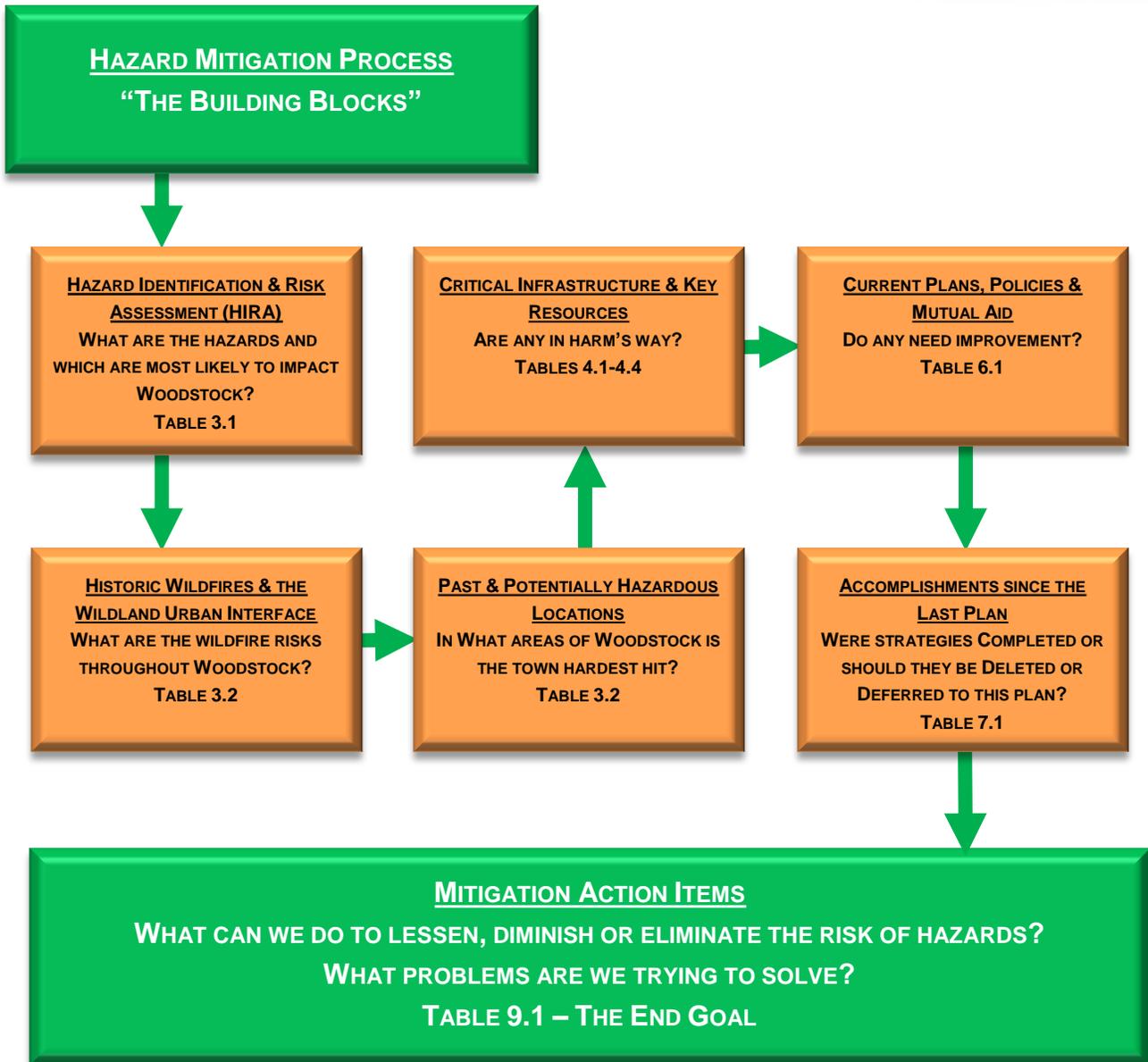
Step 11: Review the plan before submission to HSEM/FEMA for APA (Approved Pending Adoption)

Step 12: Adopt and monitor the plan

I. HAZARD MITIGATION BUILDING BLOCKS & TABLES

Using a “building block” approach, the base, or foundation, for the mitigation plan update was the prior plan. Each table that was completed had its starting point with the last hazard mitigation plan completed by the community.

Ultimately, the “building blocks” led to the final goal, the development of prioritized mitigation “action items” that, when put into an action plan, would lessen or diminish the impact of natural hazards on the town.



J. NARRATIVE DESCRIPTION OF THE PROCESS

The plan was developed with substantial local, state and federal coordination. Completion of this new hazard mitigation plan required significant planning preparation. All meetings were geared to accommodate brainstorming, open discussion and increased awareness of potentially hazardous conditions in the town.

The planning process included a complete review of the 2014 Woodstock Hazard Mitigation Plan. Using the 2014 plan as a base, each element of the old plan was examined and revised to reflect changes that had taken place in development and in the priorities of the community. In addition, referring to the 2014 plan, strategies from the past were reassessed and improved upon for the future.

The following narrative explains how the 2014 Woodstock Hazard Mitigation Plan was used during each step of the planning process to make revisions that resulted in this plan.

MEETING 1, FEBRUARY 6, 2019

The first full meeting of the Woodstock Hazard Mitigation Team was held on February 6, 2019. Meeting attendance included Ryan Oleson (Police Chief & EMD), Kevin Millar (Police Officer & Deputy EMD), Gil Rand (Select Board), Mike Welch (Department of Public Works Director), Patrick Griffin (Linwood Ambulance), Judy Welch (Executive Assistant), John Neely (US Forest Service), Kayla Henderson (NH Homeland Security & Emergency Management), Paul Hatch (NH Homeland Security & Emergency Management), Olin Garneau (Mapping and Planning Solutions) and June Garneau (Mapping & Planning Solutions).

To introduce the team to the planning process, June reviewed the evolution of hazard mitigation plans, the funding, the 12 Step Process (handout), the collaboration with other agencies and the Goals (handout). June also explained the need to sign-in, track time (handout) and to provide public notice to encourage community involvement.

Work then began on *Table 2.1, Town Statistics*. Most of the work on this table was completed at this meeting, except for a few items that June would either determine through GIS or get at a later date. There was some discussion about the seasonal population change in Woodstock in the summer and winter. It was determined that Woodstock has a significant influx of visitors, which could place an additional burden on the emergency responders.

Next on the Agenda were hazard identification and the completion of *Table 3.1, Hazard Identification & Risk Assessment (HIRA)*. Using the town's last HMP and the State of New Hampshire Multi-Hazard Mitigation Plan Update 2018, the team was able to assess which hazards could affect the community. After the hazards had been

**HAZARDS MITIGATION
POTENTIAL TEAM MEMBERS**

FEDERAL
USDA Forest Service

STATE
Department of Transportation (DOT)
Department of Natural & Cultural Resources (DNCR)
Office of Strategic Initiatives (OSI)

LOCAL
Select Board Members (Past/Present)
Town Manager/Administrator
Town Planner
Police Chief
Fire Chief
Emergency Management Director
Emergency Medical Services
Fire Warden
Health Officer
Building Inspector
Code Enforcement Officer
Education/School
Recreation Director
Public Works Director
Road Agent
Water Management
Public Utilities
Waste Management
Dam Operator(s)
Major Employer(s)

LOCAL - SPECIAL INTEREST
Land Owners
Home Owners
Forest Management
Timber Management
Tourism & Sportsman's Groups
Developers & Builders

EXPERTS
GIS Specialists

identified, the team then assessed the risk severity and probability by ranking each hazard on a scale of 1-5 (5 being very high or catastrophic) based on the following:

- The Human Impact Probability of Death or Injury
- The Property Impact Physical Losses and Damages
- The Business Impact Interruption of Service
- The Probability Likelihood of this occurring within 25 years

The rankings were then calculated to reveal the hazards which pose the most significant risks to the community. Eleven natural hazards, five technological hazards and four human-caused hazards were identified. After analyzing these hazards in Table 3.1, Inland Flooding, Severe Winter Weather, Extreme Temperatures and Tropical & Post-Tropical Cyclones were designated “High Risk” natural hazards for the town.

Having completed Table 3.1, the team started working on descriptions of each hazard and how they could or do impact the community. To gain more knowledge of the impact of these hazards, June asked the team to describe each hazard as it relates explicitly to Woodstock. For example, some of the questions asked were:

- *How often do these hazards occur?*
- *Do the hazards damage either the roads or structures?*
- *Have the hazards resulted in loss of life?*
- *Are the elderly and functional needs populations, particularly at risk?*
- *What has been done in the past to cope with the hazards?*
- *Was outside help requested?*
- *Are the hazards further affected by an extended power failure?*
- *What mitigation actions can we take to eliminate the hazards or diminish their impact?*

In addition to bringing more awareness to the hazards, these questions provided information used to further analyze the impact of the hazards on the community. June noted that these descriptions would be used in Chapter 5.

With time running out before the hazard descriptions were completed, June advised the team that the remaining hazard descriptions would be completed at the next meeting. June thanked the team for their work and assigned “homework” to team members, including requesting that the DPW Director prepare a list of road/culvert projects that would need to be completed within the next five years. June also asked the team to think about Critical Infrastructure & Key Resources (CIKR) and past events that have affected the town. The next meeting was scheduled for Wednesday, March 20, 2019.

Meeting 1 – February 6, 2019

1) Introduction

- a) Evolution of Hazard Mitigation Plans & Community Wildfire Protection Plans
- b) Reasons for Hazard Mitigation and Update
- c) Community involvement to solicit input on how to mitigate the effects of hazards
- d) Devise a plan that lessens, diminishes or completely eliminates the threat of Hazards to the town

2) The Process

- a) Funding
- b) Review of 12 Step Process & the team (handout)
- c) Collaboration with other Agencies (HSEM, WMNF)

3) Meetings

- a) Community Involvement - Public Notice, Press Release
- b) Stakeholders
- c) Signing In, Tracking Time, Agendas, Narrative (handout)

4) Today's Topics

- a) Table 2.1, Town Information
- b) Table 3.1, Hazard Identification & Analysis
- c) Hazard Descriptions
- d) Table 4.1-4.4, Critical Infrastructure & Key Resources

5) Homework

- a) Homework – Critical Infrastructure & Key Resources
- b) Digital Photos – contributions welcome

6) Future Meetings

- a) _____

MEETING 2, MARCH 20, 2019

Meeting attendance included Ryan Oleson, Kevin Millar, Gil Rand, Mike Welch, Judy Welch, Paul Hatch, Olin Garneau and June Garneau.

The meeting began with a review of the work that was done at the previous meeting. June reviewed *Table 2.1, Town Statistics*, to ensure that the town data was accurate; no changes were made. June then reviewed *Table 3.1, Hazard Identification & Risk Assessment (HIRA)* to be sure the team felt the hazards were in the correct order for the town.

Next on the agenda was the completion of the hazard descriptions that were started at the previous meeting. While doing the hazard descriptions, development trends were also discussed.

Next, the team worked on *Tables 4.1–4.4, Critical Infrastructure & Key Resources (CIKR)*. The Emergency Response Facilities, the Non-Emergency Response Facilities, the Facilities & Populations to Protect and the Potential Resources from the 2014 plan were examined, and a few minor adjustments were made for this plan. Also, the evacuation routes, helicopter landing zones and bridges on the evacuation routes were defined. Lastly, each one of the Critical Infrastructure & Key Resources was analyzed for their “Hazard Risk”.

Table 7.1, Accomplishments since the Last Plan, also pre-populated with data from the 2014 plan, was the next agenda item. June led the team through each strategy to determine which of these was “Completed” should be “Deleted” or should be “Deferred” to this plan as a new mitigation action item. Some of the action items from the 2014 plan had been completed or partially completed by the town while some were deleted as they were felt to be no longer useful or considered to be emergency preparedness, not mitigation. Still, others were “deferred” for consideration as new “Action Items” for this plan.

With time running out, June reviewed what would take place at the next meeting and thanked the team. The next meeting was set for Wednesday, April 10, 2019.

MEETING 3, APRIL 10, 2019

Meeting attendance included Ryan Oleson, Kevin Millar, Mike Welch, Patrick Griffin, Chad Morris (Lincoln Police Chief & EMD), Paul Hatch, Olin Garneau and June Garneau.

The first item on the agenda was a review of the work that was done at the previous two meetings. The review included a brief look at *Table 2.1, Town Statistics*, *Table 3.1, Hazard Identification & Risk Assessment* and *Tables 4.1-4.4, Critical Infrastructure & Key Resources*.

Meeting 2 – March 20, 2019**1) Last Meeting**

- a) Reviewed planning process, purpose, funding & collaboration.
- b) Reviewed of community involvement and stakeholders
- c) Worked on Table 2.1, Town Information
- d) Worked Table 3.1, Hazard Identification & Analysis
- e) Worked on Hazard Descriptions (Did not finish)

2) Today's Topics

- a) Review....
 - i) Table 2.1, Town Statistics
 - ii) Table 3.1, Hazard Identification & Analysis
- b) Finish Hazard Descriptions
- c) Work on....
 - i) Table 3.2, Historic Hazard Identification
 - ii) Table 4.1-4.4, Critical Infrastructure & Key Resources
 - iii) Table 6.1, Current Plans, Policies & Mutual Aid (time allowing)
 - iv) Table 7.1, Accomplishments since the prior Plan (time allowing)

3) Homework

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

4) Future Meetings

- a) April 10, 2018 @ 9:00 AM
- b) May 8, 2018 @ 9:00 AM

Next, June walked the team through a complete review of Table 7.1. Having translated her notes from the last meeting into paragraphs, June reviewed each item in Table 7.1 to see if the concepts and ideas of the team remained intact and to verify the accuracy of the information. With this review, a few changes were made, leaving five additional items from Table 7.1 (that were not also in Table 6.1) deferred to become new mitigation action items for this plan. Although several strategies from the last plan were determined to be emergency preparedness and not mitigation, the team decided to keep them in the plan as reminders to get these essential action items completed.

The team then began work on *Table 3.2, Historic Hazard Identification*, which lists past and potentially hazardous locations or events. First, they looked at the hazards that were listed in the last plan and determined which they would like to see kept in this plan. Next, the team examined the record of Major Disaster and Emergency Declarations that have taken place in recent years.

Next on the agenda, the team then began working on *Table 6.1, Current Plans, Policies & Mutual Aid*; like other tables, this table was also pre-populated with information from the 2014 plan. Looking at the existing policies from the last plan and the mechanisms that are currently in place, the team determined if each plan, policy or mutual aid system should be designated as “No Improvements Needed” or “Improvements Needed” based on the “Key to Effectiveness” found in Chapter 6.

It was explained to the team that those items that needed improvement would become new “Action Items” for this plan and be discussed again and re-prioritized when we got to our final table, *Table 9.1, The Mitigation Action Plan*.

With time running out and Table 6.1 not yet completed, June adjourned the meeting and promised to write statements to support the concepts and ideas that were expressed for Table 6.1. The next meeting was scheduled for Wednesday, May 29, 2019.

MEETING 4 – MAY 29, 2019

Meeting attendance included Ryan Oleson, Kevin Millar, Gil Rand, Mike Welch, Patrick Griffin, Judy Welch, Angel Ekstrom (Central NH Public Health Network), Olin Garneau and June Garneau.

First on the agenda was a review of the work that was done at the previous meeting, including a review of *Table 3.2, Historic Hazard Identification*. While reviewing Table 3.2, June took the opportunity to explain the Wildland Urban Interface (WUI); this area is determined to be the area in which the urban environment interfaces with the wildland environment and the area that is most prone to the risk of wildfires. In Woodstock, it was noted that the WUI, if determined using the 1,320-foot buffer method, would cover only the area along Class V roadways, but that much of the town is forested. Therefore, the entire town was thought to be in the WUI. Mitigation strategies were discussed to protect structures and to educate the town’s citizens about the risk of wildfire.

Meeting 3 – April 10, 2019

1) Last Meeting

- a) Reviewed Tables 2.1 and 3.1
- b) Completed Hazard Descriptions
- c) Discussed Development
- d) Worked on Table 4.1-4.4, Critical Infrastructure & Key Resources
- e) Began work on Table 7.1, Accomplishments since the last Plan

2) Today’s Topics

- a) Review Table 4.1-4.4, Critical Infrastructure & Key Resources
- b) Continue working on Table 7.1, Accomplishments since the last Plan
- c) Work on Table 3.2, Historic Hazard Identification
- d) Work on Table 6.1, Current Plans, Policies & Mutual Aid (time allowing)

3) Homework

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

4) Future Meetings

- a) May 8, 2018 @ 9:00 AM

After reviewing Table 3.2, June first reviewed the notes from *Table 6.1, Current Plans, Policies & Mutual Aid* from the previous meeting that she had transferred into full paragraphs. After a quick review and minor changes, June and the team finished where they had left off on *Table 6.1, Current Plans, Policies & Mutual Aid*. Work on this table resulted in 17 new “Action Items” for this plan, some of which are also in Table 7.1.

To end the meeting, June provided the team with handouts detailing a comprehensive list of possible mitigation action items (see Chapter 8, Section A & B and Appendix F). June also encouraged team members to explore the link on their agendas for the FEMA Mitigation Idea booklet to see if any of the strategies in this book would be useful in Woodstock (see below).

The next meeting was scheduled for July 10, 2019.

Link to explore:

FEMA Mitigation Ideas

https://www.fema.gov/media-library-data/20130726-1904-25045-0186/fema_mitigation_ideas_final508.pdf

MEETING 5 – JULY 10, 2019

Meeting attendance included Kevin Millar, Mike Welch, Judy Welch, Olin Garneau and June Garneau.

The meeting began with an overall recap of the work that had already been done. The recap included a brief look at each of the following completed tables:

- *Table 2.1 – Town Statistics*
- *Table 3.1 – Hazard Identification & Risk Assessment (HIRA)*
- *Table 3.2 – Historic Hazard Identification*
- *Tables 4.1-4.4 – Critical Infrastructure & Key Resources*
- *Table 6.1 – Current Plans, Policies & Mutual Aid*
- *Table 7.1 – Accomplishments since the Last Plan*

This review helped the team understand how each of these tables served as a building block for the final two tables, *Table 8.1, Potential Mitigation Strategies & the STAPLEE* and *Table 9.1, The Mitigation Action Plan*.

In addition to the action items identified in Tables 6.1 and 7.1, the team then reviewed additional potential action items. Using the handouts that had been provided by June at the last meeting, the team reviewed a

Meeting 4 – May 29, 2019

1) Last Meeting

- a) Reviewed Tables 2.1, 3.1 & 4.1 for newcomer
- b) Reviewed language in....
 - i) Table 7.1, Accomplishments since the last Plan
- c) Worked on....
 - i) Table 3.2, Historic Hazard Identification
 - ii) Table 6.1, Current Plans, Policies & Mutual Aid (did not finish)

2) Today's Topics

- a) Review....
 - i) Table 3.2, Historic Hazard Identification
- b) Finish work on....
 - i) Table 6.1, Current Plans, Policies & Mutual Aid
- c) Work on....
 - i) Table 9.1, Mitigation Action Plan
 - ii) STAPLEE

3) Homework

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

4) Future Meetings

- a) May 29, 2019 @ 9:00 AM
- b) July 10, 2019 @ 9:00 AM

Meeting 5 – July 10, 2019

1) Last Meeting

- a) Reviewed....
 - i) Table 3.2, Historic Hazard Identification
- b) Finished....
 - i) Table 6.1, Current Plans, Policies & Mutual Aid
- c) Worked on....
 - i) Table 9.1, Mitigation Action Plan (did not finish)
 - ii) STAPLEE (did not finish)

2) Today's Topics

- a) Finish work on....
 - i) Table 9.1, Mitigation Action Plan
 - ii) STAPLEE

3) Homework

- a) Review materials sent by MAPS
- b) Digital Photos – contributions welcome

4) Future Meetings

- a) _____

comprehensive list of mitigation strategies that were derived from several sources. One of the sources used was the FEMA document, “Mitigation Ideas: A Resource for Reducing Risk to Natural Hazards, January 2013” (see Chapter 8, Sections A & B and Appendix F).

Next, the team began work on *Table 8.1, Potential Mitigation Action Items & the STAPLEE* and *Table 9.1, The Mitigation Action Plan*. June explained to the team that these tables were combined for the meeting, but that they would become separate tables in the final plan. Action items deferred from Tables 6.1 and 7.1 had been added to Tables 8.1 and 9.1. The team looked carefully at each “Action Item” to assign responsibility, the time frame for completion, the type of funding that would be required and the estimated cost of the action (see Chapter 9, Section B).

Documentation for the planning process, including public involvement, is required to meet DMA 2000 (44CFR§201 (c) (1) and §201.6 (c) (1)). The plan must include a description of the planning process used to develop the plan, including how it was prepared, who was involved in the process, and how other agencies participated. A description of the planning process should include how the planning team or committee was formed, how input was sought from individuals or other agencies who did not participate on a regular basis, what the goals and objectives of the planning process were, and how the plan was prepared. The description can be in the plan itself or contained in the cover memo or an appendix.

Work on this table included the STAPLEE process, as shown in Chapter 8. Using handouts provided by the planner, the team was able to go through the STAPLEE process for the action items that had been identified. The STAPLEE analysis would then become *Table 8.1, Potential Mitigation Action Items & the STAPLEE*. Most importantly, the STAPLEE process enabled the team to consider the cost-benefit of each action item.

Although most of Tables 8.1 and 9.1 were complete, there were a few action items to discuss at the next meeting, as well as the “ranking” and “prioritizing” of each action item. June provided the team with one last handout that would be used during the next meeting, an explanation of the Ranking/Prioritizing (Chapter 9, Section A) method.

The next meeting was scheduled for September 4, 2019.

MEETING 6 – SEPTEMBER 4, 2019

Meeting attendance included Ryan Oleson, Kevin Millar, Gil Rand, Mike Welch, Patrick Griffin, Judy Welch, Chad Morris, Doug Moorhead (Citizen & former Police Chief), Cheryl Bourassa (Administrative Assistant), Mark Gagnon (Police Officer), Olin Garneau and June Garneau.

The meeting began where we had left off in Tables 9.1 & 8.1. After we had considered each strategy that was forwarded from Tables 6.1 & 7.1, the team considered additional mitigation items, some June had suggested from other plans. After much discussion and a careful review, ultimately, the team settled on twenty-nine “Mitigation Action Items” that they felt were achievable, and that would help to diminish the impact of natural hazards in the future.

Meeting 6 – September 4, 2019

- 1) Last Meeting**
 - a) Worked on....
 - i) Table 9.1, Mitigation Action Plan (did not finish)
 - ii) STAPLEE (did not finish)
- 2) Today’s Topics**
 - a) Finish work on....
 - i) Table 9.1, Mitigation Action Plan
 - ii) STAPLEE
- 3) Homework**
 - a) Review materials sent by MAPS
 - b) Digital Photos – contributions welcome
- 4) Future Meetings**
 - a) _____

With the meeting coming to an end, the team decided to hold one more meeting to work on Ranking & Priority. The meeting was scheduled for September 25, 2019.

MEETING 7 – SEPTEMBER 25, 2019

Meeting attendance included Ryan Oleson, Kevin Millar, Gil Rand, Mike Welch, Patrick Griffin, Judy Welch, Cheryl Bourassa, Olin Garneau and June Garneau.

Once all of the mitigation action items had been determined, and the STAPLEE was completed for each, the team was now ready for the ranking & prioritizing of the identified action items.

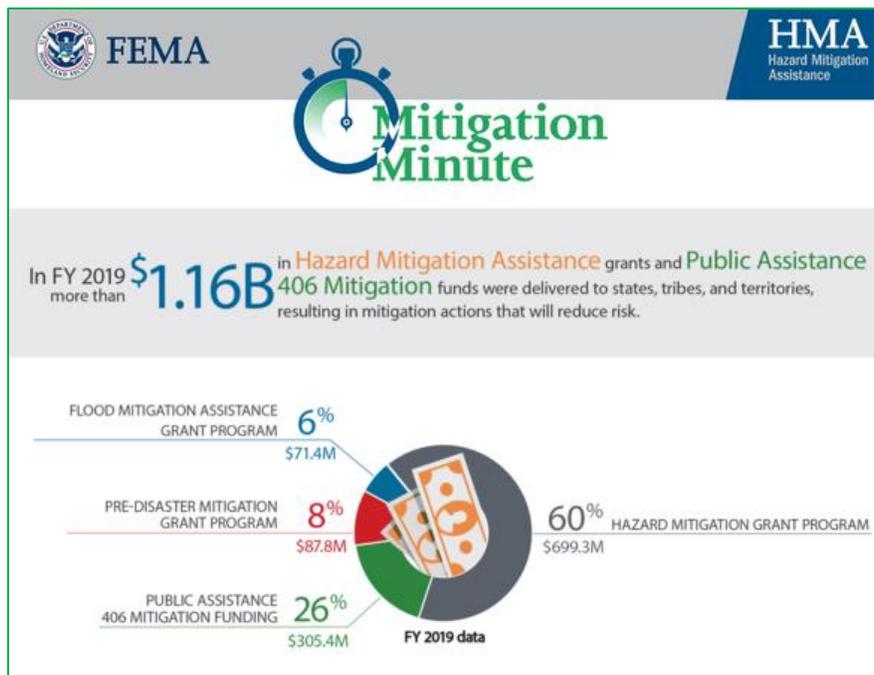
Before the meeting, June had pre-ranked the action items based on the time frame, the town’s authority to get the strategy accomplished, the type of strategy, and the STAPLEE score. June had placed the action items in four categories, as shown in Chapter 9, Section A and prepared a handout listing all of the identified action items. The team was able to see all of the action items clearly and to determine any changes that needed to be made, including changes in the “rank”.

Then within each rank, the team assigned a priority. For example, if seven action items were ranked “1” then the priority rank was 1-7. In this fashion, the team was able to determine which action items were the most important within their rankings and in which order the action items would be accomplished.

With Tables 8.1 and 9.1 completed, the team’s work was complete, except for the final review. June agreed to put the final “draft” plan together and email a copy for the town’s review. June explained the process from this point forward and thanked the team for their hard work. No additional meeting was scheduled.

Meeting 7 – September 25, 2019

- 1) Last Meeting**
 - a) Finished....
 - i) Table 9.1, Mitigation Action Plan
 - ii) STAPLEE
- 2) Today’s Topics**
 - a) Work on....
 - i) Ranking & Priority
 - ii) Process going forward
- 3) Homework**
 - a) Review materials sent by MAPS
 - b) Digital Photos – contributions welcome
- 4) Future Meetings**
 - a) _____



*Mitigation Minute for January 15, 2020
Federal Emergency Management Agency*

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Chapter 2: Community Profile

Woodstock
New Hampshire



A. INTRODUCTION

Woodstock is a beautiful community located in Grafton County in the central part of New Hampshire. Woodstock is bordered to the north by Easton and Lincoln, to the east by Thornton, to the south by Ellsworth and Warren and to the west by Benton. As a community in the “White Mountains” tourism region of New Hampshire, Woodstock is located in some of the high peaks of New Hampshire.

TOWN GOVERNMENT

A three-member Select Board governs the Town of Woodstock. The town’s departments include, but are not limited to, Fire, Police, Public Works, Planning, School and Conservation. The largest employer in Woodstock is the Woodstock Inn, with 130+ employees.

DEMOGRAPHICS & HOUSING

In the last 30 years, the population of Woodstock has increased by a growth rate of approximately 36.3%. The population change from 1980 (1,008) to 2010 (1,374) showed an increase of 366 according to US Census 2010. Woodstock’s population in 2017 was estimated to be 1,363.⁴

The American Community Survey (2013-2017) estimates a total of 1,442 housing units, most of which are single-family (812). There are 525 multiple-family structures and 105 mobile homes and other housing units. The median household income is estimated to be \$52,845, and the median age is 41.7 years.⁵ Census 2010 estimates that of the 797 vacant housing units, 701 are used for recreational, seasonal or occasional use, thus confirming the presence of second home and seasonal residents.

EDUCATION & CHILD CARE

Woodstock students in grades K-12 attend Lincoln-Woodstock School District in Lincoln. There are no colleges or universities in Woodstock, nor are there any child care facilities or private schools.

Incorporated: 1763

Origin: This town was first granted in 1763 as Peeling, after an English town, to Eli Demerit and others. Many of the settlers were from Lebanon, Connecticut, and acquainted with that town’s minister, Reverend Eleazar Wheelock, who later founded Dartmouth College. The terms of the charter were not met, and in 1771 Governor John Wentworth regranted the town to Nathaniel Cushman and others. In this grant, the town was named Fairfield, after Fairfield, Connecticut. In 1840, the town was renamed Woodstock by act of legislature, after a historic palace in Woodstock, England.

Villages and Place Names: Fairview, Lost River, North Woodstock

Population, Year of the First Census Taken: 83 residents in 1800

Population Trends: Population change for Woodstock totaled 536 over 57 years, from 827 in 1960 to 1,363 in 2017. The largest decennial percent change was an increase of 21 percent between 2000 and 2010; population declined from 1990 to 2000. The 2017 Census estimate for Woodstock was 1,363 residents, which ranked 169th among New Hampshire’s incorporated cities and towns.

Population Density and Land Area, 2017 (US Census Bureau): 23.3 persons per square mile of land area. Woodstock contains 58.4 square miles of land area and 0.5 square miles of inland water area.

Source: Economic & Labor Market Information Bureau, NH Employment Security, July 2019; Received 8/7/2018

⁴ Economic & Labor Market Information Bureau, NH Employment Security, July 2019. Community Response 8/7/2018.

⁵ American Community Survey, 2013-2017; the Census Bureau

NATURAL FEATURES

The Town of Woodstock covers approximately 58.4 square miles of land area and 0.5 square miles of inland water. The community is dominated by the mountains, lakes, rivers and streams of central New Hampshire. The highest peak is Mount Jim, a spur of Mount Moosilauke at 4,172' above sea level. The lowest elevation in town is around 740' above sea level near the center of town.

Vegetation is typical of northern New England, including both deciduous and conifer forests, open fields, swamp and riverine areas. The terrain lends itself to an abundance of small ponds, streams and rivers, most notably the Pemigewasset River, Mirror Lake, Elbow Pond and Russell Pond.

TRANSPORTATION

Five major roadways run through Woodstock; they are Interstate 93 (I-93), US Route 3, NH Route 112, NH Route 118 and NH Route 175. I-93, US Route 3 and NH Route 175 all travel north-south from Lincoln in the north to Thornton in the south. These three roadways parallel each other on the eastern border of the town. NH Route 112 travels from Benton in the northwest corner of Woodstock, skirting the northern border of the town until heading off into Lincoln. NH Route 118 travels from Warren in the southwest corner of the town, meeting up with Route 112 in the north-central part of Woodstock. Other smaller and less traveled roadways lend access to other areas of the town.

B. EMERGENCY SERVICES

EMERGENCY OPERATIONS CENTER & EMERGENCY MANAGEMENT DIRECTOR

The Town of Woodstock has a designated Emergency Management Director (EMD) and a Deputy EMD. The EMD maintains an Emergency Operations Center (EOC) as part of the town's emergency preparedness program. The EOC is where the EMD, department heads, government officials and volunteer agencies gather to coordinate their response to a major emergency or disaster event. In Woodstock, the designated EOC is the Town Offices.

WOODSTOCK FIRE RESCUE & EMS

The Woodstock Fire Department is a volunteer fire department providing quality fire services and emergency medical services to the residents and visitors of Woodstock 24 hours a day, 365 days a year. The department staffs a paid-on-call Chief, 22 paid-on-call firefighters, and operates two stations within the community. The Woodstock Fire Department participates in Twin State Fire Mutual Aid along with other area departments. Emergency medical services and transportation is provided by Linwood Ambulance.

WOODSTOCK POLICE DEPARTMENT

The Woodstock Police Department is a full-time department providing quality law enforcement services to the residents and visitors of Woodstock. The department staffs a full-time Chief, five full-time officers and one part-time officer. The Woodstock Police Department has mutual aid agreements with surrounding towns, NH State Police and the Grafton County Sheriff's Office.

WOODSTOCK DEPARTMENT OF PUBLIC WORKS

The Woodstock Department of Public Works (DPW) operates on a year-round, 24-hour basis as needed. The department staffs a full-time Superintendent, three full-time employees and one part-time employee. The DPW’s mission is to support the citizens of Woodstock through the safe operation, proper maintenance and future development of highway, supporting infrastructure and utilities in a cost-conscious manner without sacrificing quality. The DPW belongs to the NH Public Works Mutual Aid Association.

MEDICAL FACILITIES

Woodstock’s closest medical facility is Spere Memorial Hospital in Plymouth (23 miles, 25 beds). If the need arises, alternative medical facilities are Littleton Regional Healthcare in Littleton (24 miles, 25 beds) and Cottage Hospital in Woodsville (24 miles, 25 beds).

EMERGENCY SHELTER(S)

The primary shelter is the location to which evacuees are directed at the time of an emergency. In Woodstock, the designated primary shelter is the Woodstock Inn, which offers a large sleeping area, restrooms, showers and kitchen facilities and has a permanent generator. The designated secondary shelter for the town is the Town Offices. If the need arises, Deer Park Recreation Building, White Mountain Information Center or the Pemi-Valley Church could be used as possible shelters.

C. WOODSTOCK’S CURRENT & FUTURE DEVELOPMENT TRENDS

Over the last ten years, development in Woodstock has been consistent with development trends in the rest of New Hampshire. Nearly every community in New Hampshire has experienced a significant drop in new home construction since the late 2000s. This trend is only now beginning to change, but in Woodstock, change has been slow. Information provided by City-Data.com (see chart to the right) supports this trend in Woodstock.⁶

The team reported that development in Woodstock over the past five years has been slow; however, few minor subdivisions, such as subdividing one lot into two and a few new single-family homes have been built. One of the most significant changes in development was the addition of the “Ice Castles” enterprise on NH Route 112, having moved from Lincoln to Woodstock with the purchase of land and the development of a 10-year plan. This winter attraction anticipates a 65-day operating schedule and approximately 160,000 visitors a year; this is, of course, weather dependent. Also, a small cluster of moderate-income housing is being considered on NH Route 112, dependent upon the satisfaction of requirements to combat flooding. No major subdivisions have been requested, and no large-scale development is

**Single-family new house
Construction building permits**

- 1997: 1 building, cost: \$44,200
- 1998: 5 buildings, average cost: \$94,400
- 1999: 6 buildings, average cost: \$65,800
- 2000: 9 buildings, average cost: \$116,000
- 2001: 15 buildings, average cost: \$128,900
- 2002: 12 buildings, average cost: \$118,900
- 2003: 13 buildings, average cost: \$141,400
- 2004: 12 buildings, average cost: \$153,000
- 2005: 10 buildings, average cost: \$217,700
- 2006: 8 buildings, average cost: \$217,700
- 2007: 6 buildings, average cost: \$217,700
- 2008: 4 buildings, average cost: \$217,700
- 2009: 6 buildings, average cost: \$165,800
- 2012: 1 building, cost: \$153,700
- 2013: 2 buildings, average cost: \$190,000
- 2014: 2 buildings, average cost: \$211,200
- 2015: 2 buildings, average cost: \$211,200
- 2016: 5 buildings, average cost: \$246,000
- 2017: 6 buildings, average cost: \$246,000

⁶ City-Data.com; <http://www.city-data.com/city/Woodstock-New-Hampshire.html>

anticipated in the near future. No development has occurred in hazard-prone areas or has impacted the town’s hazard vulnerability.

The Planning Board and the Select Board will monitor growth in Woodstock using existing regulatory documents such as the Floodplain Management Ordinance, the Zoning Ordinance, the Subdivision Regulations, Site Plan Review Regulations and the Woodstock Master Plan. Building Permits are required in Woodstock, and as a small community, Planning Board and Select Board members, along with other town officials, are almost always aware of the building that is taking place.

The Planning Board will follow town building and subdivision regulations to ensure that any building in hazardous areas will be built to minimize vulnerability to the hazards identified in this plan. The town recognizes the importance of growth but also understands the impact that hazards can have on new facilities and homes if built within hazardous areas of the community. Town officials will continue to monitor any new growth and development, including new critical facilities, with regards to potentially hazardous events.

TABLE 2.1: TOWN STATISTICS

Table 2.1 - Town Statistics				
Census Population Data	2010	2000	1990	1980
Woodstock, NH - Census Population Data	1,374	1,140	1,168	1,008
Grafton County	89,118	81,826	74,998	65,806
Population Estimate for 2017 (<i>US Census</i>)	1,363			
<i>Elderly Population-% over 65 (*ACS 2013-2017)</i>	14.8%			
<i>Median Age (*ACS 2013-2017)</i>	41.7			
<i>Median Household Income (*ACS 2013-2017)</i>	\$52,845			
<i>Individuals below the poverty level (*ACS 2013-2017)</i>	6.6%			
<i>Change in Population-Summer (%)</i>	600-800%			
<i>Change in Population-Winter (%)</i>	600-800% (weekends heavier than midweek)			
Housing Statistics (2010 Census)				
<i>Total Housing Units</i>	1,421			
<i>Occupied Housing Units</i>	624 (435 Owner Occupied; 189 Renter Occupied)			
<i>Vacant Housing Units</i>	797 (701 Seasonal, Recreation, Occasional Use; 28 All Other Vacant Housing Units)			
<i>Assessed structure value (2019-MS1)</i>	Value	1% Damage	5% Damage	
<i>Residential</i>	\$145,463,300	\$1,454,633	\$7,273,165	
<i>Manufactured Housing</i>	\$4,369,490	\$43,695	\$218,475	
<i>Commercial</i>	\$19,519,570	\$195,196	\$975,979	
<i>Tax Exempt</i>	\$7,832,900	\$78,329	\$391,645	
<i>Utilities</i>	\$4,226,540	\$42,265	\$211,327	
<i>Totals</i>	\$181,411,800	\$1,814,118	\$9,070,590	
*The chart above indicates the value of structures only and the likely loss value based on either a loss of 1% or 5% of structures.				

Table 2.1 - Town Statistics	
Regional Coordination	
<i>County</i>	Grafton
<i>Tourism Region</i>	White Mountains
Municipal Services & Government	
<i>Town Administrator or Manager</i>	No
<i>Select Board</i>	Yes; elected (3 members)
<i>Planning Board</i>	Yes; elected
<i>School Board</i>	Yes; part of Lincoln-Woodstock Cooperative School District
<i>Zoning Board of Adjustment</i>	No
<i>Conservation Committee</i>	Yes; appointed
<i>Master Plan</i>	Yes; 2014
<i>Emergency Operation Plan (EOP)</i>	Yes; 2014
<i>Hazard Mitigation Plan (HMP)</i>	Yes; 2014
<i>Zoning Ordinances</i>	No
<i>Subdivisions Regulations</i>	Yes; 2011
<i>Capital Improvement Plan</i>	No
<i>Capital Reserve Funds</i>	Yes
<i>Building Permits Required</i>	Yes
<i>Town Web Site</i>	Yes; www.woodstocknh.org
<i>Floodplain Ordinance</i>	Yes; Stand-a-lone; 2014
<i>Member of NFIP</i>	May 5, 1991
<i>Flood Insurance Rate Maps (DFIRMS)</i>	February 20, 2008
<i>Flood Insurance Rate Study (FIS)</i>	February 20, 2008
Percent of Local Assessed Valuation by Property Type-2017 (NH Department of Revenue)	
<i>Residential Buildings</i>	85.5%
<i>Commercial Land & Buildings</i>	13.0%
<i>Other (including Utilities)</i>	1.9%
Emergency Services	
<i>Town Emergency Warning System(s)</i>	CodeRED
<i>School Emergency Warning System(s)</i>	Blackboard Connect
<i>Emergency Page</i>	No
<i>Facebook</i>	North Woodstock Facebook (private), Fire Department, Police Department
<i>ListServ</i>	No
<i>Local Newspapers</i>	Littleton Courier; North Country News; Plymouth Record Enterprise
<i>Public Access TV</i>	No
<i>Local TV Stations</i>	WMUR Channel 9

Table 2.1 - Town Statistics	
<i>Local Radio</i>	No
<i>Police Department</i>	Yes; full-time Chief, five full-time, one part-time officer
<i>Police Dispatch</i>	Grafton County Dispatch
<i>Police Mutual Aid</i>	Surrounding towns & NH State Police
<i>Animal Control Officer</i>	No (Police Department)
<i>Fire Department</i>	Yes; paid-on-call Chief, 22 paid-on-call firefighters
<i>Fire Dispatch</i>	Twin State Fire Mutual Aid
<i>Fire Mutual Aid</i>	Twin State Fire Mutual Aid
<i>Fire Stations</i>	Two
<i>Fire Warden</i>	Yes
<i>Emergency Medical Services</i>	Linwood Ambulance
<i>EMS Dispatch</i>	Lincoln Dispatch
<i>Emergency Medical Transportation</i>	Linwood Ambulance
<i>HazMat Team</i>	Central NH HazMat Team
<i>Established EMD</i>	Yes
<i>Established Deputy EMD</i>	Yes
<i>Public Health Network</i>	North Country Regional Public Health Network
<i>Health Officer</i>	Yes
<i>Building Inspector</i>	Yes
<i>Established Public Information Officer (PIO)</i>	No
<i>Nearest Hospital(s)</i>	Speare Memorial Hospital, Plymouth (23 miles, 25 beds)
	Littleton Regional Healthcare, Littleton (24 miles, 25 beds)
	Cottage Hospital, Woodsville (24 miles, 25 beds)
<i>Local Humane Society or Veterinarians</i>	Linwood Veterinary; NH Humane Society (Meredith)
<i>Primary EOC</i>	Town Offices (generator)
<i>Secondary EOC</i>	Woodstock Fire Station (generator) or Lower Woodstock Fire Station (portable generator)
<i>Primary Shelter</i>	Woodstock Inn (generator)
<i>Secondary Shelter</i>	Town Offices (generator)
<i>Other Shelters</i>	Deer Park Recreation Building, White Mountain Information Center & Pemi-Valley Church
Utilities	
<i>Town Sewer</i>	Municipal & Private septic
<i>Department of Public Works</i>	Yes; full-time Superintendent, three full-time, one part-time employee
<i>Public Works Mutual Aid</i>	Yes
<i>GIS Analysis - Class V Roads</i>	8.03 total; 4.16 paved; unpaved 3.87

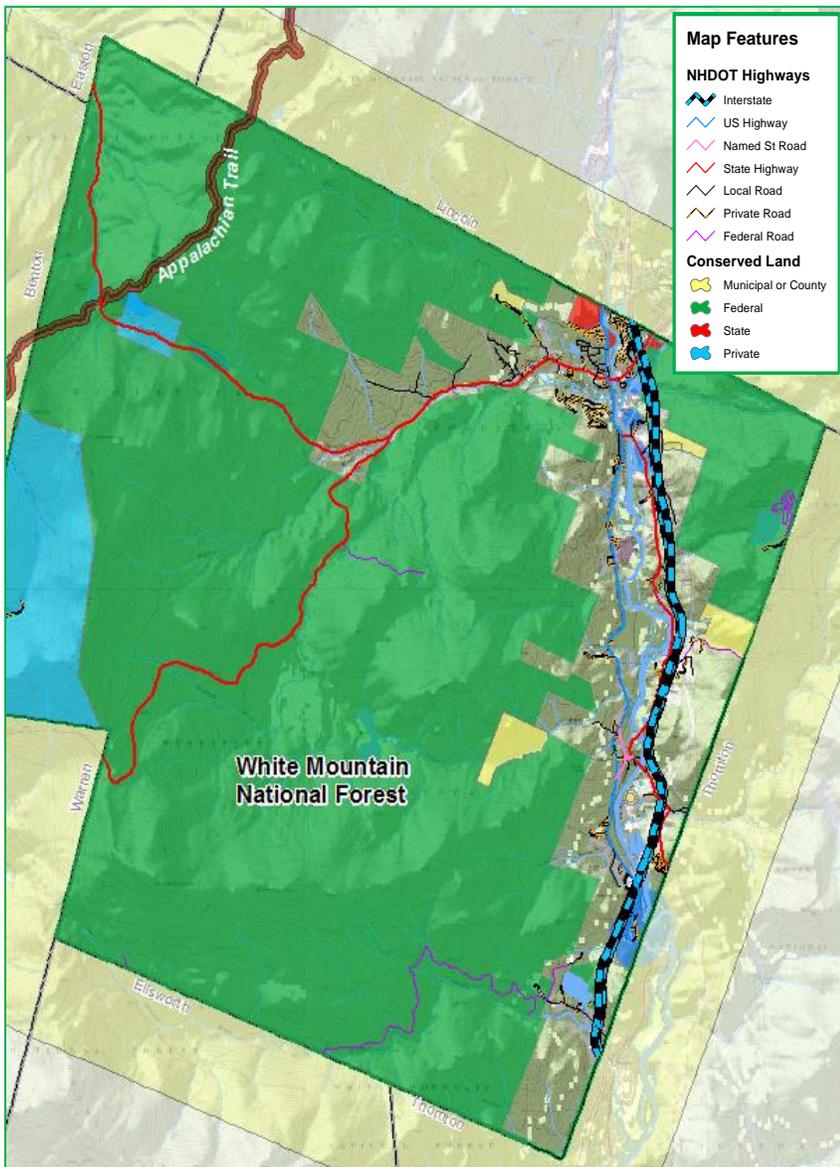
Table 2.1 - Town Statistics

<i>Water Supply</i>	Municipal & Private wells
<i>Waste Water Treatment Plant</i>	Yes
<i>Electric Supplier</i>	NH Electric Coop
<i>Natural Gas Supplier</i>	None
<i>Cellular Telephone Access</i>	Yes
<i>Pipelines</i>	No
<i>High-Speed Internet</i>	Yes
<i>Telephone Company</i>	Consolidated Communications & Spectrum
Transportation	
<i>Primary Evacuation Routes</i>	I-93, US Route 3 & NH Routes 112, 118 & 175
<i>Secondary Evacuation Routes</i>	None
<i>Nearest Interstate</i>	I-93, Exits 30-32 (Local Access)
<i>Nearest Airstrip</i>	Franconia Airport, Franconia (2,305 ft. turf runway)
<i>Nearest Commercial Airport(s)</i>	Lebanon Municipal Airport, Lebanon (60 miles)
	Manchester-Boston Regional Airport, Manchester (81 miles)
<i>Public Transportation</i>	The Shuttle Connection (private taxi cab service); Gannon Taxi Service
<i>Railroad</i>	Yes; state-owned (leased to Hobo Railroad)
Education & Childcare	
<i>Elementary/Middle/High School</i>	Grades K-12 are part of Lincoln-Woodstock Cooperative
<i>School Administrative Unit</i>	SAU 68
<i>Licensed Childcare Facility</i>	0 facilities, 0 capacity
Fire Statistics (NH Division of Forests & Lands, Fire Warden Report, 2017 and the town)	
<i>Wildfire Fires (2017 & 2018)</i>	2017 - The Dilley Fire, Class C (72 acres) 2018 - No wildfires
<i>Grafton County Fire Statistics (2017)</i>	2 fires, 51 acres
<i>State Forest Fires Statistics (2017)</i>	64 fires, 107 acres
*ACS: The American Community Survey, a five-year average of randomly mailed long-form surveys from the Census Bureau	
** According to the town, the state & federal portion of land in Woodstock is approximately 87%.	
Information found in Table 2.1, unless otherwise noted, was derived from the Economic & Labor Market Information Bureau, NH Employment Security, July 2019. Community Response Received 8/07/2018; https://www.nhes.nh.gov/elmi/products/cp/profiles-pdf/woodstock.pdf	

Table 2.1 - Town Statistics

Conserved Land as a Percent of Land in the community (GIS Analysis; 2019 Conservation Files, Granit, UNH)

	Square Miles	Percent of Town Land
Approximate Square Miles in Community	58.40	100.0%
Approximate Total Un-Conserved Land	10.11	17.3%
Approximate Total Conserved Land **	48.29	82.7%
Municipal/County Land (1)	0.56	1.0%
Federal Owned Land (2)	44.61	76.4%
State Owned Land (3)	0.11	0.2%
Quasi Private(4)	0.00	0.0%
Private Land (5)	3.02	5.2%



**Conserved Land in Woodstock
GIS Analysis - MAPS**

Chapter 3: Hazard Identification, Risk Assessment & Probability

A. HAZARD IDENTIFICATION

The first step in hazard mitigation is to identify hazards. The team determined that 11 natural hazards have the potential to affect the community. *Table 3.1, Hazard Identification & Risk Assessment (HIRA)*, provides estimates of the level of impact that each listed hazard could have on humans, property and business and averages them to establish an index of “severity”. The estimate of “probability” for each hazard is multiplied by its severity to establish an overall “relative threat” factor.

The NH State Hazard Mitigation Plan includes many of the same potential hazards that have been identified in Woodstock. Several of the state’s hazards, however, were excluded from this plan. These include the following:

<u>State Hazard</u>	<u>Reason for exclusion from this plan</u>
Coastal Flooding	Distance away from the sea
Solar Storm & Space Weather	The team felt this was not something the town can manage
Avalanches	No known areas of avalanches
Radiological	Distance away from any radiological sites
Known & Emerging Contaminates	Homeowners would handle mitigation

Specific hazards that have affected the town, the region and the state in the past are detailed in *Table 3.2, Historic Hazard Identification* and Chapter 5.

B. RISK ASSESSMENT

The hazards listed in Table 3.1 were then classified based upon the “Relative Threat” score as calculated in Column F; these were then separated into three categories using Jenks’ Optimization, which is also known as natural breaks classification.⁷ The “Relative Threat” score was then labeled into three categories, *High Risk, Medium Risk and Low Risk*, as shown in Table 3.1, Column G. These categories are also indicated in Chapter 5, Sections B-D. By using this grouping process, the plan demonstrates each hazard’s likelihood of occurrence in combination with its potential effect on the town. This process illustrates a comprehensive hazard statement and assists the town with understanding which hazards should receive the most attention.



In addition to the relative threat analysis determined in Table 3.1, the team used *Tables 4-1-4.4, Critical Infrastructure & Key Resources (CIKR)*, to identify and analyze the potential hazard risk based on a scale of 1-3 for each CIKR.

⁷ The natural breaks classification process is a method of manual data classification partitions data into classes based upon natural groups within the data distribution; ESRI, <http://support.esri.com/en/knowledgebase/GISDictionary/term/natural%20breaks%20classification>

C. PROBABILITY

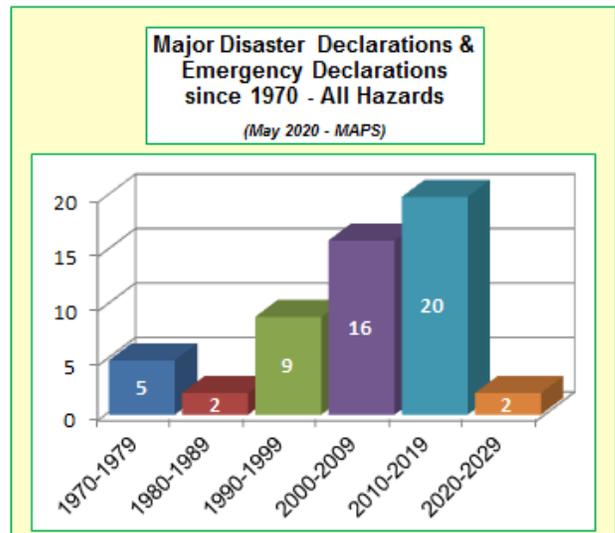
The determination of the probability of occurrence is contained within Column D in Table 3.1, which assesses hazards based upon the likelihood of the hazard’s manifestation within 25 years. The probability scores indicate whether the identified hazard has a *Very Low, Low, Moderate, High and Very High* probability. Probability categories are also indicated in Chapter 5, Sections B-D.

Overall, the Town of Woodstock is reasonably safe from the effects of natural, technological and human-caused hazards. However, due to Woodstock’s geographic location, forested lands, hills, heavy snowpack and topography, there is always a probability that future hazards will occur.

HAZARD PROBABILITY & CLIMATE CHANGE

Although not identified as a natural hazard in this plan, no plan can be considered complete today without some discussion of the impact that climate change has had on weather patterns. In its State Mitigation Plan Review Guide, FEMA state, *"The challenges posed by climate change, such as more intense storms, frequent heavy precipitation, heat waves, drought, extreme flooding, and higher sea levels, could significantly alter the types and magnitudes of hazards impacting states in the future"*.⁸ By including climate change in the new hazard mitigation guide for state planners, FEMA recognizes the reality of climate change.

The chart to the right shows the increased frequency of Major Disaster Declarations and Emergency Declarations in the State of New Hampshire, which may be indicative of climate change.⁹ COVID-19 is indicated for the decade beginning in 2020.



Communities in New Hampshire, such as Woodstock, should become increasingly aware of the effects of climate change on the hazards that are already being experienced and anticipate an increase in probability in the future.

HAZARD PROBABILITY COMBINED WITH LONG TERM UTILITY OUTAGE

Any potential disaster in Woodstock is particularly impactful if combined with long term utility outage, as would most likely be the case with severe winter storms, blizzards and ice storms, hurricanes, tropical storms and windstorms. The food supply of individual citizens could become quickly depleted should a power failure last for a week or more. An outage during the winter months could result in frozen pipes and the lack of water and heat, a particular concern for the town’s elderly and vulnerable citizens. The effects of any hazard, when combined with a long term utility outage, could result in a higher probability of damaging effects on the community.

⁸ State Mitigation Plan Review Guide, FEMA, Released March 2015, Effective March 2016, Section 3.2, page 13

⁹ Derived from FEMA’s record of disasters; categorized by decade since 1970 by the planner; 2020-2029 includes COVID-19

TABLE 3.1: HAZARD IDENTIFICATION & RISK ASSESSMENT (HIRA)

Table 3.1 - Hazard Identification & Risk Assessment							
Scoring for Probability (Columns A, B & C)	Column A	Column B	Column C	Column D	Column E (A+B+C)/3	Column F D x E	Risk Level
1=Very Low (0-20%)	What is the probability of death or injury?	What is the probability of physical losses & damage?	What is the probability of interruption of service?	What is the probability of this occurring within 25 years?	Average of Human, Property & Business Impact	Relative Threat	High 8.0-16.67
2=Low (21-40%)							
3=Moderate (41-60%)							
4=High (61-80%)	Human Impact	Property Impact	Business Impact	Probability of Occurrence	Severity	Risk Severity x Occurrence	Medium 4.0-7.9
5=Very High (81-100%)							
Natural Hazards							
1) Inland Flooding	2.00	4.00	4.00	5.00	3.33	16.67	High
2) Severe Winter Weather	3.00	3.00	2.00	4.00	2.67	10.67	High
3) Extreme Temperatures	2.00	3.00	2.00	4.00	2.33	9.33	High
4) Tropical & Post-Tropical Cyclones	2.00	3.00	3.00	3.00	2.67	8.00	High
5) High Wind Events	2.00	3.00	2.00	3.00	2.33	7.00	Medium
6) Wildfires	2.00	2.00	3.00	3.00	2.33	7.00	Medium
7) Lightning	2.00	3.00	2.00	2.00	2.33	4.67	Medium
8) Earthquakes	4.00	4.00	4.00	1.00	4.00	4.00	Medium
9) Infectious Diseases	4.00	1.00	3.00	1.00	2.67	2.67	Low
10) Landslide & Erosion	1.00	2.00	1.00	2.00	1.33	2.67	Low
11) Drought	1.00	1.00	1.00	1.00	1.00	1.00	Low
Technological Hazards							
1) Conflagration	3.00	4.00	4.00	2.00	3.67	7.33	Medium
2) Long Term Utility Outage	2.00	3.00	3.00	2.00	2.67	5.33	Medium
3) Hazardous Materials	2.00	2.00	2.00	1.00	2.00	2.00	Low
4) Aging Infrastructure	1.00	2.00	2.00	1.00	1.67	1.67	Low
5) Dam Failure	1.00	1.00	1.00	1.00	1.00	1.00	Low
Human-cause Hazards							
1) Transport Accidents	5.00	3.00	1.00	3.00	3.00	9.00	High
2) Mass Casualty Incidents	5.00	2.00	1.00	3.00	2.67	8.00	High
3) Cyber Events	1.00	2.00	4.00	2.00	2.33	4.67	Medium
4) Terrorism & Violence	3.00	3.00	3.00	1.00	3.00	3.00	Medium

D. NATIONAL FLOOD INSURANCE PROGRAM (NFIP) STATUS

Woodstock has been a member of the National Flood Insurance Program (NFIP) since May 5, 1991. Woodstock actively monitors NFIP and related compliance issues and participates in offered training by the State of NH or FEMA that address flood hazard planning.

Woodstock has a relatively small flood plain with approximately 2.06 square miles of land in the floodplain¹⁰, 0.5 square miles of which is inland water. The floodplain areas of Woodstock are primarily along the Pemigewasset River and Lost River. Woodstock is likely to experience flooding on several roads and along most small rivers and streams. The latest Flood Insurance Rate Studies (FIRS) and Digital Flood Insurance Rate Maps (DFIRMS) are dated February 20, 2008.

According to the NH Office Strategic Initiatives, there are 201 NFIP residential policies in effect in Woodstock for a total of \$38,567,400 of insurance in force. Seven losses have been paid for a total of \$99,591, and there have been no repetitive losses claimed¹¹.

WOODSTOCK FLOODPLAIN MANAGEMENT ORDINANCE

The Town of Woodstock has flood zone regulations as part of the Town of Woodstock, Floodplain Management Ordinance, first adopted at Town Meeting on March 11, 2014. The town uses this document as a guide for development and to ensure compliance and enforcement of NFIP standards. The Planning Board, as the initiator and the Select Board, as the enforcer, adhere to the rules, regulations and requirements outlined in the Town of Woodstock, Floodplain Management Ordinance. The floodplain ordinance can be found online on the town's website.¹² Below is a brief description of each section of the Woodstock Floodplain Management Ordinance. Items in italic are taken directly from the ordinance.

Section I – Purpose (quoted in its entirety)

“Certain areas of the Town of Woodstock, New Hampshire are subject to periodic flooding, causing serious damages to properties within these areas. Relief is available in the form of flood insurance as authorized by the National Flood Insurance Act of 1968. Therefore, the Town of Woodstock, New Hampshire has chosen to become a participating community in the National Flood Insurance Program, and agrees to comply with the requirements of the National Flood Insurance Act of 1968 (P.L. 90-488, as amended) as detailed in this Floodplain Management Ordinance.”

Section II – Establishment (quoted in its entirety)

“This ordinance, adopted pursuant to the authority of RSA 674:16, shall be known as the Town Woodstock, New Hampshire Floodplain Management Ordinance.”



In 1968, although well-intentioned government flood initiatives were already in place, Congress established the National Flood Insurance Program (NFIP) to address both the need for flood insurance and the need to lessen the devastating consequences of flooding. The goals of the program are twofold: to protect communities from potential flood damage through floodplain management, and to provide people with flood insurance.

For decades, the NFIP has been offering flood insurance to homeowners, renters and business owners, with the one condition that their communities adopt and enforce measures to help reduce the consequences of flooding.

Source:

http://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp

¹⁰ GIS Analysis of Grafton County DFIRM (Digital Flood Insurance Rate Map)

¹¹ NH Office of Strategic Initiatives; Jennifer Gilbert, February 8, 2019

¹² https://www.woodstocknh.org/sites/g/files/vyhli1471/f/uploads/mx-4070n_20190615_171024.pdf

The following regulations in this ordinance shall apply to all lands designated as special flood hazard areas by the Federal Emergency Management Agency (FEMA) in its "Flood Insurance Study for the Town of Woodstock in the County of Grafton, New Hampshire" or as amended, together with the associated Flood Insurance Rate Maps, Flood Boundary, and Floodway Maps or as amended, which are declared to be a part of this ordinance and are hereby incorporated by reference."

Section III - Permits (quoted in its entirety)

"All proposed development in any special flood hazard area shall require a permit and be in compliance with any town regulations adopted by the Town of Woodstock."

Section IV – Construction Requirements (quoted in its entirety)

"The Woodstock Board of Selectmen or its designee shall review all building permit applications for new construction or substantial improvements to determine whether proposed building sites will be reasonably safe from flooding. If a proposed building site is located in a special flood hazard area, all new construction or substantial improvements shall:

- a. be designed (or modified) and adequately anchored to prevent floatation, collapse, or lateral movement of the structure resulting from hydrodynamic and hydrostatic loads, including the effects of buoyancy;*
- b. be constructed with materials resistant to flood damage;*
- c. be constructed by methods and practices that minimize flood damages; and*
- d. be constructed with electrical, heating, ventilation, plumbing, and air conditioning equipment, and other service facilities that are designed and/or located so as to prevent water from entering or accumulating within the components during conditions of flooding."*

Section V – Water and Sewer Systems (quoted in its entirety)

"Where new or replacement water and sewer systems (including on-site systems) are proposed in a special flood hazard area the applicant shall provide the Board of Selectmen or its designee with assurance that these systems will be designed to minimize or eliminate infiltration of flood waters into the systems and discharges from the systems into flood waters, and on-site waste disposal systems will be located to avoid impairment to them or contamination from them during periods of flooding."

Section VI – Certification

Section VI outlines the requirements for certification to build a new structure or perform substantial improvements to existing structures. These requirements include "...the as-built elevation (in relation to NGVD) of the lowest floor (including basement) and include whether or not such structures contain a basement...any certification of floodproofing."

Section VII – Other Permits (quoted in its entirety)

"The Board of Selectmen or its designee shall not grant a building permit until the applicant certifies that all necessary permits have been received from those governmental agencies from which approval is required by federal or state law, including Section 404 of the Federal Water Pollution Control Act Amendments of 1972, 33 U.S. C. 1334."

Section VIII – Watercourses

"In riverine situations, prior to the alteration or relocation of a watercourse, the applicant for such authorization shall notify the Wetlands Bureau of the New Hampshire Department of Environmental Services and submit copies of such notification to the Building Inspector, in addition to the copies required by RSA 482-A:3. Further, the applicant shall be required to submit copies of said notification to those adjacent communities as determined by the Board of Selectmen or its designee, including notice of all scheduled hearing before the Wetlands Bureau."

This section goes on to say that “The applicant shall submit to the Board of Selectmen, certification provided by a registered professional engineer, assuring that the flood carrying capacity of an altered or relocated watercourse can and will be maintained.” This item also addresses encroachment to water sources and demonstration that the “proposed development, when combined with all existing and anticipated development, will not increase the water surface elevation of the base flood more than one foot at any point within the community.”

Section IX – Special Flood Hazard Areas

“In special flood hazard areas, the Board of Selectmen or its designee shall determine the 100-year flood elevation in the following order of precedence according to the data available...” This item addresses the use of 100-year flood data, lowest floor elevation, hydrostatic and hydrodynamic loads, and the effect of buoyancy, floodproofing and certification by a registered professional. This section also addresses, among other things, regulations for manufactured homes and recreational vehicles.

Section X – Variances and Appeals

Section X outlines the details of the variance and the appeal process to the Woodstock Board of Adjustment. It further details the “burden” that the applicant must show, the notification process, and the maintenance of records for any variance that is approved.

Section XI – Definitions

Section XI provides a list of the various terms and their definitions as they apply to the Woodstock Floodplain Management Ordinance.

The Woodstock Floodplain Management Ordinance also includes the following sections: “Severability”, “Greater Restrictor” and an “Enforcement Section”.

Severe Repetitive Loss (SRL) Properties--NFIP-insured buildings that, on the basis of paid flood losses since 1978, meet either of the loss criteria described on page SRL 1. SRL properties with policy effective dates of January 1, 2007, and later will be afforded coverage (new business or renewal) only through the NFIP Servicing Agent’s Special Direct Facility so that they can be considered for possible mitigation activities.

Source: <http://www.fema.gov/national-flood-insurance-program/definitions#R>

Although not addressed in the floodplain ordinance, erosion from flooding, including road and culvert washouts is a potential concern in Woodstock, although some of these problems have been mitigated. With any significant rainfall, particularly when combined with rapid snowmelt, roads, ditches and culverts within the town may become overwhelmed.

The team understands that the benefits of the NFIP also extend to structures that are not in the 100-year floodplain. The town will continue to work with the NH Office of Strategic Initiatives and will carefully monitor its compliance with the NFIP. The team felt that it is worthwhile to have NFIP brochures and information available at the Town Office for current homeowners and potential developers and has included several flood-related mitigation strategies in this plan.

Table 3.1, Table 3.2 and Chapter 5, Section B provide more information on past and potential hazards in Woodstock.

TABLE 3.2: HISTORIC HAZARD IDENTIFICATION

2014 HMPT = 2014 Hazard Mitigation Planning Team
 2020 HMPT = 2020 Hazard Mitigation Planning Team

DR Major Disaster Declarations (DR) since 1953
 EM Emergency Declarations (EM) since 1953

Table 3.2 - Historic Hazard Identification				
Type of Event	Date of Event	Location	Description	Source
<p>A. Inland flooding including riverine, heavy rainfall, rapid snowmelt, ice jam flooding, flooding as a result of dam failure & local road flooding. Riverine flooding is the most common disaster event in the State of NH. Significant riverine flooding in some areas of the state occurs in less than ten-year intervals and seems to be increasing with climate change. The entire state of NH has a high flood risk. Flood events have the potential to impact the community on a townwide basis. No significant flooding events have taken place in Woodstock since October 2017 rain event.</p>				
<p>Summary of flood events including Major Disaster & Emergency Flood Declarations in the state & regionwide</p>				
<p>Flooding Before 1970</p>	<p>1927, 1936, 1938, 1943 (2), 1953, 1955, 1959</p>		<p>Spring and fall flooding events resulting from severe storms or heavy snowmelt</p>	<p>See below</p>
<p>Flooding 1970-1979</p>	<p>1972 (DR-327), 1973 (DR-399), 1974 (DR-411), 1976, 1978 (DR-549), 1979 (EM-3073)</p>			
<p>Flooding 1980-1989</p>	<p>1986 (DR-771), 1987 (DR-789)</p>			
<p>Flooding 1990-1999</p>	<p>1990 (DR-876), 1991 (DR-923), 1991 (DR-917), 1995, 1996 (DR-1077), 1996 (DR-1144), 1998 (DR-1231)</p>			
<p>Flooding 2000-2009</p>	<p>2003 (DR-1489), 2005 (DR-1610), 2006 (DR-1643), 2007 (DR-1695), 2008 (DR-1787), 2008 (DR-1799)</p>			
<p>Flooding 2010 - Present</p>	<p>2010 (DR-1892), 2010 (DR-1913), 2011 (DR-4006), 2012 (DR-4065), 2013 (DR-4139), 2015 (DR-4206), 2017 (DR-4329), 2017 (DR-4355), 2018 (DR-4370)</p>			
<p>Summary of flood events in the community</p>				
<p>Flooding Heavy Rain</p>	<p>1980's</p>	<p>Dead River Bulk Propane Facility</p>	<p>Flooding caused a tank to break loose.</p>	<p>2008 HMPT & 2020 HMPT</p>
<p>Flooding Heavy Rain</p>	<p>Past & Potential</p>	<p>Route 112 (Lost River Road)</p>	<p>Washouts</p>	<p>2008 HMPT & 2020 HMPT</p>
<p>Flooding Heavy Rain</p>	<p>1994</p>	<p>Route 112 (Lost River Road)</p>	<p>Washouts</p>	<p>2008 HMPT & 2020 HMPT</p>

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
Flooding Heavy Rain	1994	Jack O 'Lantern Resort	Major golf course damage	2008 HMPT & 2020 HMPT
Flooding Heavy Rain	1994	North End of Route 175	Undersized culvert floods, the road became temporarily impassible	2008 HMPT & 2020 HMPT
Flooding Heavy Rain	October 20- November 15, 1995	Woodstock	Major Disaster Declaration DR-1077: Sewage Treatment Plant berm washed out. Woodstock received federal funding to assist with costs.	FEMA & 2020 HMPT
Flooding Heavy Rain	October 7- 18, 2005	Belknap, Cheshire, Grafton, Hillsborough, Merrimack & Sullivan	Major Disaster Declaration DR-1610: State and federal disaster assistance reached more than \$3 million to help residents and business owners in New Hampshire recover from losses resulting from the severe storms and flooding in October. Woodstock received heavy rain but no significant flooding or structure damage.	FEMA & 2014 HMPT & 2020 HMPT
Flooding Heavy Rain	May 12-23, 2006	Belknap, Carroll, Grafton, Hillsborough, Merrimack, Rockingham & Strafford	Major Disaster Declaration DR-1643: Flooding occurred in most of southern NH during May 12-23, 2006 (aka Mother's Day Storm). Woodstock received heavy rain but no significant flooding or structure damage.	FEMA & 2014 HMPT & 2020 HMPT
Flooding Heavy Rain	April 15-23, 2007	All Ten NH Counties	Major Disaster Declaration DR-1695: FEMA & SBA obligated more than \$27.9 million in disaster aid for flood damages following the April nor'easter (aka Tax Day Storm). Woodstock received heavy rain but no significant flooding or structure damage.	FEMA & 2014 HMPT & 2020 HMPT
Flooding Heavy Rain & Tornado	July 24- August 14, 2008	Belknap, Carroll & Grafton & Coos	Major Disaster Declaration DR-1787: A period of severe storms and flooding for July 24-August 14, which also spawned a tornado on July 24, 2008. Woodstock received heavy rain but no significant flooding or structure damage.	FEMA & 2014 HMPT & 2020 HMPT
Flooding Heavy Rain	February 23 - March 3, 2010	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration: DR-1892: Flood and wind damage occurred in southern NH, including six counties resulting in 330,000 homes without power. FEMA obligated more than \$2 million by June 2010. Woodstock received heavy rain but no significant flooding or structure damage.	FEMA & 2014 HMPT & 2020 HMPT
Flooding Heavy Rain	May 26-30, 2011	Coos & Grafton County	Major Disaster Declaration DR-4006: Flooding and hail occurred as a result of a severe storm on May 26th-30th, 2011, in Coos & Grafton County (aka Memorial Day Weekend Storm). Woodstock received heavy rain but no significant flooding or structure damage.	FEMA & 2014 HMPT & 2020 HMPT

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
Flooding Tropical Storm Irene	August 26-September 6, 2011	Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan	Major Disaster Declaration: DR-4026: Tropical Storm Irene Aug 26th- Sept 6, 2011; Tropical storm Irene heavy rains, caused flooding and road closures in Woodstock (see Section C for more detail in Woodstock)	FEMA & 2014 HMPT
Flooding Heavy Rain	July 9-10, 2013	Cheshire, Sullivan & Grafton	Major Disaster Declaration DR-4139: Severe storms, flooding, and landslides occurred from June 26 to July 3, 2013, in Cheshire and Sullivan Counties and southern Grafton County. Woodstock received heavy rain but no significant flooding or structure damage.	FEMA & 2020 HMPT
Flooding Heavy Rain Landslide/Erosion	July 1-2, 2017	Grafton & Coos	Major Disaster Declaration DR-4329: The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance was available to supplement state and local recovery efforts in the areas affected by severe storms and flooding from July 1, 2017, to July 2, 2017, in two New Hampshire Counties. During this storm, Woodstock experienced flooding in several locations, including the White Mountain Motorsports Track, the Woodstock Family Park and Sellingham Hill Road. The Department of Public Works also lost land due to erosion during this storm, and a northbound lane on NH Route 175 washed out. Also, the sewer lines were uncovered, broke and took in water. The town is in the process of receiving funding from FEMA for Sellingham Hill Road and the Playground (\$15,000).	FEMA & 2020 HMPT
Flooding Heavy Rain	October 29-November 1, 2017	Sullivan, Grafton, Coos, Carroll, Belknap & Merrimack	Major Disaster Declaration DR-4355: The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance is available to the state of New Hampshire to supplement state and local recovery efforts in the areas affected by severe storms and flooding from October 29-November 1, 2017, in five New Hampshire Counties. In Woodstock, some people were trapped on Tripoli Road because of blowdowns and the playground flooded again as did several places on NH Route 175. US Route 3 was closed for a brief time. The town has applied for FEMA funding again for the playground.	FEMA & 2020 HMPT
Flooding Heavy Rain	July 11-12, 2019	Grafton County	Major Disaster Declaration DR-4457: The Federal Emergency Management Agency announced a major disaster declaration for a period of severe storms and flooding from July 11-12, 2019, in one New Hampshire County. Damage in Woodstock was not significant enough to apply for Public Assistance.	FEMA & 2020 HMPT

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
<p>B. Wildfires: New Hampshire is heavily forested and is therefore vulnerable to wildfire, particularly during periods of drought. The proximity of many populated areas to the state's forested land exposes these areas to the potential impact of wildfire. Wildfires have the potential to impact the Jurisdiction on a townwide basis. No significant wildfire events have taken place in Woodstock since the Dilly Cliff Fire in October 2017.</p>				
<p>Summary of wildfire events including Major Disaster & Emergency Wildfire Declarations in the state</p>				
Wildfire (Shaw Mountain)	July 2, 1953	Carroll County	Major Disaster Declaration DR-11: This wildfire occurred in Carrol County at Shaw Mountain. This fire did not reach Grafton County or Woodstock.	FEMA 2020 HMPT
Wildfire (Stoddard)	April 21-23, 2016	Cheshire County	Fire Management Assistance Declaration, FM-5123: Stoddard, NH. The Stoddard Fire burned 190 acres in April 2016 and caused the evacuation of 17 homes. This fire did not reach Grafton County or Woodstock.	FEMA
Wildfire (Covered Bridge Fire)	November 2016	Carroll County	The Covered Bridge Fire: A brush fire near the Albany Covered Bridge grew to 329 acres, primarily on White Mountain National Forest land. No structures were lost; Class E fire. This fire did not reach Grafton County or Woodstock.	Local Resources
Wildfire (Bayle Mountain)	May 2015	Carroll County	The Bayle Mountain Fire: This Class D fire burned 275 acres and took five days to put out on rocky and steep terrain in Ossipee, NH. Blackhawk and private helicopters, along with fire crews from all over the state, assisted in extinguishing this fire. The Bayle Mountain Fire did no damage to homes. This fire did not reach Grafton County or Woodstock.	Local Resources
<p>Summary of wildfire events in the community</p>				
Wildfire	1957	Glory Mt. at Cushman Trail (USFS)	Unknown: Arson	2008 HMPT & 2020 HMPT
Wildfire	1980	National Forest Property	Woodstock Fire Department has responded to numerous calls to the Tripoli Road areas to extinguish fires on National Forest Property (local); Class A: Car accidents, arson, unattended campfires	2008 HMPT & 2020 HMPT
Wildfire	1981	Tripoli Road	Woodstock/Thornton town line on Tripoli Road (local); Class A: Arson	2008 HMPT & 2020 HMPT
Wildfire	1982	Russell Pond Campground	Class A: Arson	2008 HMPT & 2020 HMPT
Wildfire	1995	Kinsman Notch	Kinsman Notch just below Mt. Blow (USFS); Unknown: Lightning	2008 HMPT & 2020 HMPT
Wildfire	1997	Elbow Pond	Class A: Campfire	2008 HMPT & 2020 HMPT

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
Wildfire	2002	Route 112 (Lost River Road)	Route 112 (Lost River Road) (A5); Class A: Campfire	2008 HMPT & 2020 HMPT
Wildfire	2011	Route 3	Route 3 S. north of Pine Crest; Class A: Unknown; roughly 1/2 Acre	2014 HMPT & 2020 HMPT
Wildfire (Dilly Cliff)	October 2017	Woodstock Grafton County Route 112 (Lost River Road)	The Dilly Cliff Fire took place along the Lost River Gorge Trail in North Woodstock off Route 112 (Lost River Road); Class C: Human-caused; 75 acres. The Dilly Cliff Fire was finally extinguished 36 days after it began.	2020 HMPT

Woodstock Fire Department has also responded to the Wildwood Campground to assist with firefighting in the National Forest on numerous occasions (dates not determined). Also, the Woodstock Annual Reports for the years ending in 2012 and 2013 indicated that seven “forest fire” calls were made in 2012 and one “forest fire” call was made in 2013, but specific locations and sizes were not determined. Overall, the Woodstock 2014 and 2020 HMPTs felt that wildfires were not a very significant threat to the town.

C. High Wind Events including Tropical & Post-Tropical Cyclones, Tornadoes, Downbursts & Windstorms: Tornadoes are spawned by thunderstorms and occasionally by hurricanes; tornadoes may occur singularly or in multiples. A downburst is a severe localized wind blasting down from a thunderstorm. Downburst activity is prevalent throughout NH and is becoming more prevalent with climate change; most downbursts go unrecognized unless significant damage occurs. Hurricanes develop from tropical depressions that form off the coast of Africa. New Hampshire's exposure to direct and indirect impacts from hurricanes is real, but modest, as compared to other states in New England. A hurricane that is downgraded to a Tropical Storm is more likely to have an impact in New Hampshire. Tornadoes and other wind events have the potential to impact the community on a townwide basis. No significant high wind events have taken place in Woodstock since Tropical Storm Irene in 2011.

Summary of high wind events & tropical & post-tropical cyclone events including Major Disaster & Emergency High Wind Declarations in the state & nationwide

Tropical & Post-Tropical Cyclones	1804, 1869, 1938, 1944, 1954 (2), 1960, 1976, 1978, 1985, 1991 (DR-917), 1999 (DR-1305), 2005 (EM-3258), 2011 (EM-3333 & DR-4026), 2012 (EM-3360)	Number 4 (1938), Number 7 (1944), Carol (1954), Edna (1954), Donna (1960), Belle (1976), Amelia (1978), Gloria (1985), Bob (1991), Floyd (1999), Katrina (2005), Irene (2011), Sandy (2012)	See below
High Wind Events Tornadoes	1814, 1890, 1951, 1953, 1957, 1961, 1963, 2008 (DR-1782)	All listed tornadoes were reported as F2 tornadoes except for the June 1953 tornado, which was reported as an F3.	See below

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
Summary of high wind & tropical & post-tropical cyclone events in the community				
Tropical & Post-Tropical Cyclone Great New England Hurricane	September 21, 1938	State & Regionwide	The Great New England Hurricane: Statewide, there were multiple deaths and damages in NH were about \$12.3 million in 1938 dollars (about \$200 million now). Throughout New England, 20,000 structures were damaged and 26,000 automobiles, 6,000 boats and 325,000 sugar maples were lost. 80% of people lost power. Although there was no local recollection, it was expected that in Woodstock, the damage would have been similar to the rest of the state. (Source http://nhpr.org/post/75th-anniversary-new-englands-greatest-hurricane)	FEMA & 2020 HMPT
Tropical & Post-Tropical Cyclone Hurricanes Carol & Edna	August 31, 1954	State & Regionwide	Hurricanes Carol & Edna: Hurricane Carol resulted in an extensive amount of trees blown down and damage to damage as well as large crop losses. Localized flooding and winds measuring over 100 mph also occurred. Hurricane Carol was followed by Hurricane Edna just 12 days later, which caused already weakened trees to fall. Although there was no local recollection, it was expected that in Woodstock, the damage would have been similar to the rest of the state. (Source: http://www.wmur.com/Timeline-History-Of-NH-Hurricanes/11861310)	FEMA & 2020 HMPT
Tropical & Post-Tropical Cyclone Hurricane Bob	August 18-20, 1991	State & Regionwide	Major Disaster Declaration DR-917: There was no significant impact in Woodstock.	FEMA & 2020 HMPT
High Wind Events Downburst Long Term Utility Outage	1999	Townwide	Macroburst, two roofs were blown off structures, downed trees, widespread power outages and damaged utility poles & wires.	2008 HMPT & 2020 HMPT
Tropical & Post-Tropical Cyclone Tropical Storm Floyd	September 16-18, 1999	Belknap, Cheshire & Grafton	Major Disaster Declaration DR-1305: The declaration covers damage to public property from the storm that spawned heavy rains, high winds and flooding for September 16-18. No significant impact in Woodstock.	FEMA & 2020 HMPT
Tropical & Post-Tropical Cyclone Hurricane Katrina (evacuation)	August 29-October 1, 2005	All Ten NH Counties	Emergency Declaration EM-3258: Assistance was provided to evacuees from the area struck by Hurricane Katrina and to provide emergency assistance to those areas beginning on August 29, 2005, and continuing. The President's action made federal funding available to the state and all 10 New Hampshire counties. No pets or evacuees came to Woodstock.	FEMA & 2014 HMPT & 2020 HMPT

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
High Wind Events Windstorm Long Term Utility Outage	Apr-08	Woodstock	A wind storm in April of 2008 caused significant power outages, some for 4 to 5 days; trees down (some on homes), roofs blown off, wires down; April 2008	2014 HMPT & 2020 HMPT
Tropical & Post-Tropical Cyclone Tropical Storm Irene	August 26-September 6, 2011	EM 3333: All Ten NH Counties DR-4026: Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan	Major Disaster Declaration DR-4026 & Emergency Declaration EM-3333: Tropical Storm Irene, August 26th- September 6, 2011, occurred in seven New Hampshire counties causing flood and wind damage. An Emergency Declaration was also declared for all ten New Hampshire counties. In Woodstock, Irene washed out a playground, scoured out the riverbank on Lost River, took out a man-hole which allowed water to go into the sewer plant and caused damage. Two culverts were lost on Reservoir Road; Lost River Valley Campground received flood damage; Wells Road washed out; Montaup Cabins and many residences on South Main Street were flooded; White Mountain Motorsports Park was shut down due to flood damage, campground at the Motorsports Park lost campers into the Pemi; other properties on Route 3 & 175 suffered flood damage; the town received FEMA reimbursement; National Resource Conservation Services (NRCS) also provided damage reimbursement.	FEMA & 2014 HMPT & 2020 HMPT
Tropical & Post-Tropical Cyclone Hurricane Sandy	October 26-November 8, 2012	Belknap, Carroll, Coos, Grafton, Rockingham & Sullivan	Major Disaster Declaration DR-4095 & Emergency Declaration EM-3360: The declaration covers damage to property from the storm that spawned heavy rains, high winds, high tides and flooding for October 26-November 8, 2012. Hurricane Sandy came ashore in NJ and brought high winds, power outages and heavy rain to six NH counties; no significant impact in Woodstock.	FEMA & 2014 HMPT & 2020 HMPT
D. Severe Winter Weather including Nor'easters, Blizzards & Ice Storms: Severe winter weather in NH may include heavy snowstorms, blizzards, Nor'easters and ice storms, particularly at elevations over 1,000 feet above sea level. Generally speaking, NH will experience at least one of these hazards during any winter season; however, most NH communities are well prepared for such hazards. Severe winter weather and ice storms have the potential to impact the community on a townwide basis. No significant winter weather events have taken place in Woodstock since the last hazard mitigation plan.				
Summary of severe winter weather events including Major Disaster & Emergency Severe Winter Weather Declarations in the state & regionwide				
Severe Winter Weather Ice Storms	1942, 1969, 1970, 1979, 1991, 1998 (DR-1199), 2008 (DR-1812)		Major ice storms that have occurred causing major disruptions to power, transportation, public and private utilities.	FEMA & 2020 HMPT

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
Severe Winter Weather Snowstorms	1920, 1929, 1940, 1950, 1952, 1958 (2), 1960, 1961, 1969, 1978, 1982, 1993 (EM-3101), 2001 (EM-3166), 2003 (EM-3177), 2003 (EM-3193), 2004, 2005 (EM-3207), 2005 (EM-3208), 2005 (EM-3211), 2008 (EM-3297), 2009, 2011 (EM-3344 & DR-4049), 2013 (EM-1405), 2015 (DR-4209), 2017 (DR-4316), 2018 (DR-4371)		Major severe winter weather events marked by snowfalls exceeding 2' in parts of the state which resulted in disruptions to power and transportation systems.	FEMA & 2020 HMPT
Summary of severe winter storm events in the community				
Severe Winter Weather Snowstorm	Winter of 1968-69	State & Regionwide	The winter of 1968-69 brought record amounts of snow to all of New Hampshire. Pinkham Notch at the base of Mount Washington recorded more than 75" of snowfall in four days at the end of February 1969 in addition to snow that had already fallen in previous storms. All of NH experienced difficulty with snow removal because of the great depths that had fallen from December 1968 to April 1969. The Woodstock Department of Public Works handled the heavy snow accumulation.	2020 HMPT
Severe Winter Weather High Winds, Tidal Surge, Coastal Flooding & Snow	February 16, 1978	State & Regionwide	Major Disaster Declaration DR-549: The Blizzard of '78, a region-wide Blizzard severely affecting southern New England, resulted in high accumulations of snow throughout all of New England and New Hampshire. Recorded accumulations show up to 28" in northeast New Hampshire, 25" in west-central New Hampshire and 33" along with coastal New Hampshire. This storm also brought hurricane-force winds, which made this storm one of the more intense to occur this century across the northeastern United States. The Woodstock Department of Public Works handled the heavy snow accumulation.	FEMA & 2020 HMPT
Severe Winter Weather Snowstorm & High Winds	1993	Woodstock	Emergency Declaration: EM-3101: Woodstock had a few 10-18 inch snowstorms, but the Woodstock Department of Public Works handled the heavy snow accumulation.	2014 HMPT & 2020 HMPT
Severe Winter Weather Snowstorm & High Winds	March 13-17, 1994	Woodstock	Emergency Declaration EM-3101: Woodstock had a few 10-18 inch snowstorms, but the Woodstock Department of Public Works handled the snow accumulation.	FEMA & 2014 HMPT & 2020 HMPT

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
Severe Winter Weather Ice Storm Long Term Utility Outage	January 7-25, 1998	State & Regionwide	Major Disaster Declaration DR-1199: A significant ice storm struck nearly every part of the state with a more significant impact in northern communities and areas over 1,000 feet above sea level. Woodstock experienced power outages and tree damage with heavy snow and ice accumulation and trees down throughout the community.	FEMA & 2014 HMPT & 2020 HMPT
Severe Winter Weather Snowstorm	March 5-7, 2001	Cheshire, Coos, Grafton, Hillsborough, Merrimack, & Strafford	Emergency Declaration EM-3166: The emergency declaration covers jurisdictions with a record and near-record snowfall from a late winter storm that occurred March 2001 and affected six New Hampshire counties. The Woodstock Department of Public Works handled heavy snow accumulation.	FEMA & 2014 HMPT & 2020 HMPT
Severe Winter Weather Snowstorm	December 6-7, 2003	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan	Emergency Declaration EM-3193: The emergency declaration covers jurisdictions with a record and near-record snowfall that occurred for December 6-7, 2003 and affected eight New Hampshire counties. The Woodstock Department of Public Works handled the heavy snow accumulation.	FEMA & 2014 HMPT & 2020 HMPT
Severe Winter Weather Snowstorms	January 22-23, 2005 February 10-11, 2005 March 11-12, 2005	EM-3208-002 (Jan, Feb & Mar): All Ten NH Counties EM-3207 (Jan): Nine Counties EM-3208 (Feb): Five Counties EM-3211 (Mar): Five Counties	Emergency Declaration EM-3208-002: The Federal Emergency Management Agency (FEMA) had obligated more than \$6.5 million to reimburse state and local governments in New Hampshire for costs incurred in three snowstorms that hit the state in 2005. The total aid for all three storms was \$6,892,023.87 (January: \$3,658,114.66; February: \$1,121,727.20; March: \$2,113,182.01). Emergency Declaration EM-3207: The total aid for the January storm was \$3,658,114.66 (Grafton: \$137,118.71; State of NH: \$1,107,426.59); Emergency Declaration EM-3208: The total aid for the February storm was \$1,121,727.20 (Grafton: \$213,539.52; State of NH: \$521,536.78). Emergency Declaration EM-3211: The total aid for the March storm was \$2,112,182.01 (Not declared in Grafton County; State of NH: \$697,501.41). The Woodstock Department of Public Works handled the heavy snow accumulation during the winter of 2005.	FEMA & 2014 HMPT & 2020 HMPT
Severe Winter Weather Snowstorm & Ice Storm	December 11-23, 2008	All Ten NH Counties	Major Disaster Declaration DR-1812 & Emergency Declaration EM-3297: Damaging ice storm impacted the entire state, including all 10 New Hampshire counties resulting in fallen trees and large-scale power outages. Nearly \$15 million in federal aid had been obligated by May 2009. The Woodstock Department of Public Works handled the heavy snow accumulation.	FEMA & 2014 HMPT & 2020 HMPT

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
Severe Winter Weather Snowstorm	October 29-30, 2011	DR-4049: Hillsborough & Rockingham EM-3344: All Ten NH Counties	Major Disaster Declaration DR-4049 & Emergency Declaration EM-3344: A severe winter storm occurred on October 29-30, 2011, in two New Hampshire counties. EM-3344: The emergency declaration for snow removal and damage repair included all ten NH countries (aka Snowtober). The Woodstock Department of Public Works handled the heavy snow accumulation.	FEMA & 2014 HMPT & 2020 HMPT
Severe Winter Weather Snowstorm	February 8, 2013	All Ten NH Counties	Emergency Declaration DR-4105: Severe winter storm Nemo resulted in heavy snow in February 2013 in all ten New Hampshire counties. The Woodstock Department of Public Works handled heavy snow accumulation.	FEMA & 2014 HMPT & 2020 HMPT
Severe Winter Weather Snowstorm	March 14-15, 2017	Belknap & Carroll	Emergency Declaration DR-4316: A severe winter storm and snowstorm occurred in two New Hampshire counties resulting in disaster aid to supplement state and local recovery efforts. Although this storm was not declared in Grafton County, Woodstock experienced heavy snow accumulation that was handled by the Department of Public Works. Town Meeting was still held on this day.	FEMA & 2020 HMPT
Severe Winter Weather Snowstorm	March 13-14, 2018	Carroll, Strafford & Rockingham	Major Disaster Declaration, DR-4371: The Federal Emergency Management Agency announced a major disaster declaration on June 8, 2018, for a period of a severe winter storm from March 13-14, 2018. Although this storm was not declared in Grafton County, Woodstock experience heavy snow accumulation that was handled by the Department of Public Works. Town Meeting was still held on this day.	FEMA & 2020 HMPT

E. Earthquakes: According to the NH State Hazard Mitigation Plan, New Hampshire is considered to lie in an area of "Moderate" seismic activity when compared to other areas of the United States. New Hampshire is bordered to the north and southwest by areas of "Major" activity. Generally, earthquakes in NH cause little or no damage and have not exceeded a magnitude of 5.5 since 1940. Earthquakes have the potential to impact the community on a townwide basis. No significant earthquakes have taken place in Woodstock since the last hazard mitigation plan.

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
Summary of Earthquakes with a magnitude of 4.0 or greater in the state & nationwide				
Earthquakes	6/11/1638 (Central NH, 6.5), 10/29/1727 (Off Coastline, 6.0-6.3), 11/18/1755 (Off Coastline, 5.8), 11/10/1810 (Portsmouth, NH, 4.0), 7/23/1823 (Off Hampton, NH, 4.1), 12/19/1882 (Concord, NH, Unknown), 3/5/1905 (Lebanon, NH, Unknown), 8/30/1905 (Rockingham County, Unknown), 11/09/1925 (Ossipee, NH, 4.0), 3/18/1926 (New Ipswich, NH, Unknown), 11/10/1936 (Laconia, NH, Unknown), 12/20/1940 (Ossipee, NH, 5.5-5.8), 12/24/40 (Ossipee, NH, 5.5-5.8), 1/19/1982 (Laconia, NH, 4.0), 11/20/1988 (Berlin, NH, 4.0), 4/6/1989 (Berlin, NH, 4.1), 10/16/2012 (Hollis Center, ME, 4.0)		Occurrences of earthquakes with a magnitude of 4.0 or greater in recorded New Hampshire History	State of NH Multi-Hazard Mitigation Plan, Update 2018
Summary of earthquakes with a magnitude of 3.0 or greater that were felt in the community since 1940				
Earthquake	December 20, 1940	Ossipee, NH	Magnitude 5.5	State of NH Multi-Hazard Mitigation Plan, Update 2018 & 2014 HMPT & 2020 HMPT
Earthquake	December 24, 1940	Ossipee, NH	Magnitude 5.5	
Earthquake	June 15, 1973	Quebec Border / NH	Magnitude 4.8	
Earthquake	January 19, 1982	West of Laconia, NH	Magnitude 4.5	
Earthquake	April 1, 1989	Berlin, NH	Magnitude 4.1	
Earthquake	June 23, 2010	Ontario-Quebec Border	Magnitude 5.0	
Earthquake	June 26, 2010	Boscawen, NH	Magnitude 3.1	
Earthquake	October 16, 2012	Hollis Center, ME	Magnitude 4.0; in Woodstock, buildings shook for 10-30 seconds, but no damage was reported.	

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
<p>G. Miscellaneous Past or Potential Hazards: Natural, Technological and Human-caused hazards and other unusual hazardous events have been noted throughout New Hampshire. Among others, one concern is the transport of hazardous material through communities by rail and tractor-trailer. Other natural or human-caused hazards have the potential to impact the community on a townwide basis. No additional hazards have taken place in Woodstock since the 2016 drought, which did not significantly impact Woodstock.</p>				
<p>Summary of Drought in the state & nationwide</p>				
Drought	1775, 1840, 1882, 1910's, 1929-1936, 1939-1944, 1947-1950, 1960-1969, 1999; 2001-2002, 2016-2017		Occurrences of serious droughts in recorded New Hampshire history.	State of NH Multi-Hazard Mitigation Plan, Update 2018
<p>Summary of Drought in the community since 1929</p>				
Drought	1929-1936	State & Regionwide	Regional	State of NH Multi-Hazard Mitigation Plan, Update 2018 & 2020 HMPT
Drought	1939-1944	State & Regionwide	Severe in the southeast and moderate elsewhere	
Drought	1947-1950	State & Regionwide	Moderate	
Drought	1960-1969	State & Regionwide	Regional longest recorded continuous spell of less than normal precipitation	
Drought	2001-2002	State & Regionwide	The third worst drought on record	
Drought	2016-2017	State & Regionwide	Declared drought for the summer of 2016 and into 2017, moderating from extreme in southern New Hampshire to dry in the most northern communities. The drought did not significantly impact the town.	
Drought	2020	State & Regionwide	Moderate drought reported throughout New Hampshire as of September 8, 2020.	NH Drought Monitor
<p>G. Miscellaneous Past or Potential Hazards: Natural, Technological and Human-caused hazards and other unusual hazardous events have been noted throughout New Hampshire. Among others, one concern is the transport of hazardous material through communities by rail and tractor-trailer. Other natural or human-caused hazards have the potential to impact the community on a townwide basis. No additional hazards have taken place in Woodstock since the 2014 chip-truck accident and the arrival of Covid-19 in 2020.</p>				
Traffic Incident	2014	Interstate 93	Chip truck on I-93, the bottom fell out (unsafe) dropped chips all over the highway	2020 HMPT

Table 3.2 - Historic Hazard Identification

Type of Event	Date of Event	Location	Description	Source
Infectious Disease	January 20, 2020 – ongoing	All Ten NH Counties	Major Disaster Declaration, DR-4516: The Federal Emergency Management Agency ("FEMA") within the US Department of Homeland Security is giving public notice of its intent to assist the State of New Hampshire, local and tribal governments, and certain private nonprofit organizations under the major disaster declaration issued by the President on April 3, 2020, as a result of the Coronavirus Disease 2019 ("COVID-19").	FEMA & 2020 HMPT
Infectious Disease	January 20, 2020 – ongoing	All Ten NH Counties	Emergency Declaration EM-3445: Ten county declaration to provide individual assistance and public assistance as a result of the impact of COVID-19	FEMA & 2020 HMPT

H. Other Hazards: Identified hazards with no specific example of occurrence.

Natural Hazards	<p>Although the team did not identify specific examples or past occurrences of these hazards, it was felt worthwhile to list them as potential hazards to the town. These hazards have the potential to impact the community either locally or on a town-wide basis.</p> <p>See Table 3.1, Hazard Threat Analysis and Chapter 5 for more details on these hazards.</p>
Extreme Temperatures	
Lightning	
Landslide	
Technological Hazards	
Conflagration	
Hazardous Materials	
Aging Infrastructure	
Dam Failure	
Human-Caused	
Mass Casualty Incidents	
Cyber Events	
Terrorism & Violence	

*Historic hazard events were derived from the following sources unless noted otherwise:

- Website for NH Disasters: <http://www3.gendisasters.com/mainlist/newhampshire/Tornadoes>
- FEMA Disaster Information: <http://www.fema.gov/disasters>
- The Tornado Project: <http://www.tornadoproject.com/alltorns/nhtorn.htm>
- The Tornado History Project: <http://www.tornadohistoryproject.com/>
- The Disaster Center (NH): <http://www.disastercenter.com/newhamp/tornado.html>
- EarthquakeTrack.com; <http://www.EarthquakeTrack.com>

For more information on state and county-wide past events, see Major Disaster and Emergency Declarations, Appendix D, NH Major & Emergency Declarations.

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Chapter 4: Critical Infrastructure & Key Resources (CIKR)

With team discussion and brainstorming, Critical Infrastructure & Key Resources (CIKR) within Woodstock were identified. The Hazard Risk rating was based on a scale of 1-3, with 1 indicating little or no risk.

TABLE 4.1 - EMERGENCY RESPONSE FACILITIES (ERF) & EVACUATION

EMERGENCY RESPONSE FACILITIES (ERF)			
ERFs are primary facilities and resources that may be needed during an emergency response.			
Facility	Type of Facility	Hazard Risk	
Town Offices (generator)	Police Station	All Hazards	1
	Town Clerk		
	Primary EOC		
	Possible Shelter (depending on the situation)		
Woodstock Station	Primary Shelter	All Hazards	1
Linwood Ambulance Building	Emergency Medical Services	All Hazards & Flooding	1
Woodstock Fire Station (generator)	Fire Response & Secondary EOC	All Hazards	1
Lower Woodstock Fire Station (portable generator)	Fire Response & Secondary EOC	All Hazards	1
Potato Hill Road Cell Tower	Communications	All Hazards	1
Cox Farm Cell Tower	Communications	All Hazards	1
Grandview Cell Tower	Communications	All Hazards	1
Linwood Medical Associates (Lincoln)	Medical	All Hazards	1
DOT Garage (Lincoln)	Fuel for Emergency Response (all departments)	All Hazards	1
HELICOPTER LANDING ZONES (ERFH)			
Parking Lot at White Mountain Information Center	Helicopter Landing Site	All Hazards	1
Parking Lot at Lost River	Helicopter Landing Site	All Hazards	1
Bradley Airstrip (Route 175, Woodstock)	Helicopter Landing Site	All Hazards & Flooding	2
Lin-Wood High School Parking Lot	Helicopter Landing Site	All Hazards	1
Any point on Interstate 93 may also be used as a Helicopter Landing Zone			
EVACUATION ROUTES			
Interstate 93	Primary Evacuation Route	All Hazards	1
NH Route 112	Primary Evacuation Route	All Hazards & Flooding	1
NH Route 118	Secondary Evacuation Route	All Hazards & Flooding	1
NH Route 175	Secondary Evacuation Route	All Hazards & Flooding	2
US Route 3	Secondary Evacuation Route	All Hazards & Flooding	2
BRIDGES & CULVERTS ON EVACUATION ROUTES (EFRB)			
Steel Bridge & NH Route 175	Bridge on Evacuation Route	All Hazards & Flooding	2
Stone Bridge 112E over Pemigewasset	Bridge on Evacuation Route	All Hazards	1

EMERGENCY RESPONSE FACILITIES (ERF)			
ERFs are primary facilities and resources that may be needed during an emergency response.			
Facility	Type of Facility	Hazard Risk	
Route 112W over Gordon Pond Brook	Bridge on Evacuation Route	All Hazards & Flooding	2
I93S @ US Route 3	Bridge on Evacuation Route	All Hazards	1
I93N @ US Route 3	Bridge on Evacuation Route	All Hazards	1
I93S @ Pemigewasset River	Bridge on Evacuation Route	All Hazards	1
I93N @ Pemigewasset River	Bridge on Evacuation Route	All Hazards	1
I93S@ NH Route 175	Bridge on Evacuation Route	All Hazards	1
I93N@ NH Route 175	Bridge on Evacuation Route	All Hazards	1
I93S @ Tripoli Road	Bridge on Evacuation Route	All Hazards	1
I93N @ Tripoli Road	Bridge on Evacuation Route	All Hazards	1
I93S @ Pemigewasset River (1)	Bridge on Evacuation Route	All Hazards	1
I93N @ Pemigewasset River (1)	Bridge on Evacuation Route	All Hazards	1
I93S @ NH Route 112	Bridge on Evacuation Route	All Hazards	1
I93N @ NH Route 112	Bridge on Evacuation Route	All Hazards	1
Route 3 @ Gordon Pond Brook	Bridge on Evacuation Route	All Hazards	1
Memorial Bridge & NH Route 175 (at Lower Woodstock Fire Station)	Bridge on Evacuation Route	All Hazards	1
DAMS (ERFD)			
Old Reservoir Dam	Dam	All Hazards	1
Beaver Pond Dam (Low Hazard)	Dam	All Hazards	1
Mirror Lake Dam (High Hazard)	Dam	All Hazards	1
Parker's Dam	Dam	All Hazards	1

TABLE 4.2 – NON-EMERGENCY RESPONSE FACILITIES (NERF)

NON-EMERGENCY RESPONSE FACILITIES (NERF)			
NERFs are facilities that although they are critical, are not necessary for immediate emergency response efforts. NERFs would include facilities to protect public health and safety and to provide backup emergency facilities.			
Facility	Type of Facility	Hazard Risk	
Deer Park Recreation Building	Potential Shelter	All Hazards	1
White Mountain Information Center	Potential Shelter	All Hazards	1
Pemi-Valley Church	Potential Shelter	All Hazards	1
Electrical Substation (near EMS)	Electric Substation	All Hazards	1
Electrical Substation (Route 175)	Electric Substation	All Hazards	1
Water Tank Reservoir	Water Supply	All Hazards	1
Well Site	Primary Town Water Supply (Well)	All Hazards & Flooding	2
Waste Water Treatment Site	Waste Water Infrastructure	All Hazards & Flooding	2
Sewage Pump Station (generator)	Waste Water Infrastructure	All Hazards	1
Hydrant System - 7 miles	Waste Water Infrastructure	All Hazards	1

TABLE 4.3 – FACILITIES & POPULATIONS TO PROTECT (FPP)

FACILITIES & PEOPLE TO PROTECT (FPP)			
FPPs are facilities that need to be protected because of their importance to the town and to residents who may need help during a hazardous event.			
Facility	Type of Facility	Hazard Risk	
Caulder's Child Care	Child Care	All Hazards	1
Burton Senior Housing	Elderly housing	All Hazards	1
Lost River Reservation	Historic Significance	All Hazards	1
Hubbard Brook Complex	Historic Significance	All Hazards	1
Lost River Valley Campground	Campground/Population	All Hazards & Flooding	2
KOA - Broken Branch	Campground/Population	All Hazards	1
Waterrest Campground	Campground/Population	All Hazards & Flooding	2
Russell Pond Campground	Campground/Population	All Hazards	1
Tuft's University Outing Club	Recreational	All Hazards	1
Montaup Cabins	Cabins & Mobile Home Park	All Hazards & Flooding	2
Abends Trailer Park	Mobile Home Parks	All Hazards	1
White Birches Estate	Mobile Home Parks	All Hazards	1
Hoods Trailer Park	Mobile Home Parks	All Hazards	1
Marri Court	Mobile Home Parks	All Hazards	1
White Mountain Motorsports Park & Campground	Gathering of People	All Hazards & Lightning & Flooding	2

TABLE 4.4 – POTENTIAL RESOURCES (PR)

POTENTIAL RESOURCES (PR)			
PRs are potential resources that could be helpful for emergency response in the case of a hazardous event.			
Wayne's Market	Food & Water & Gas	All Hazards	1
Woodstock Inn	Food & Water	All Hazards	1
Peg's Restaurant	Food & Water	All Hazards	1
Merland's Tap & Table	Food & Water	All Hazards	1
Fadden's	Food & Water	All Hazards	1
Caulder Construction	Sand, Gravel & Heavy Equipment	All Hazards	1
Donahue Construction	Sand, Gravel & Heavy Equipment	All Hazards	1
Avery Construction	Sand, Gravel & Heavy Equipment	All Hazards	1
Loon Mountain Busses	Transportation	All Hazards	1
STATE DOT (Lincoln)	Diesel & Gas (town vehicles)	All Hazards	1
For additional resources, please refer to the Resource Inventory List in the Woodstock Emergency Operations Plan.			

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Chapter 5: Hazard Effects in Woodstock

A. IDENTIFYING VULNERABLE CRITICAL INFRASTRUCTURE & KEY RESOURCES (CIKR)

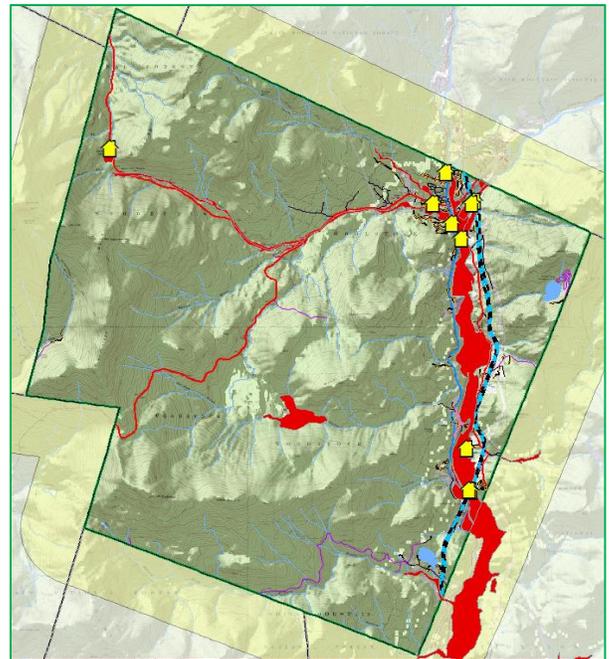
Because damages from floods and wildfires are more predictable than damages from other disasters, it is important to identify the Critical Facilities & Key Resources (CIKR) and that are most likely to be damaged by these events. Using Geographic Information System (GIS) analysis and aerial imagery, at-risk CIKR were identified throughout the town.

All CIKR in Woodstock were identified in GIS; this list was then narrowed by those CIKRs that were located in the FEMA floodplain. Ten CIKRs were found in the FEMA flood zone (see chart to the right). Two of these CIKRs are dams, and six are bridges that are expected to be near water and within the floodplain. The Bradley Airstrip and the Sewage Pump Station were also found to be in the FEMA floodplain.

ALL_H	NAME	Hazmit_Type
ERFD	Beaver Pon Dam	Dam
ERFD	Parker's Dam	Dam
ERFH	Bradley Airstrip	Heli LZ
ERFB	I93-South @ Pemi (2)	Evac Bridge
ERFB	I93-North @ Pemi (2)	Evac Bridge
ERFB	I93-South @ Pemi (1)	Evac Bridge
ERFB	I93-North @ Pemi (1)	Evac Bridge
ERFB	Route 3 @ Gordon Pond Brook	Evac Bridge
ERFB	Route 175 Steel Bridge	Evac Bridge
NERF	Sewage Pump Statoin	Sewerage Pumping

No additional CIKR were found to be in the designated FEMA floodplain, although it is expected that there may be non-CIKR structures within the flood zone. Although the floodplain is primarily along the Pemigewasset and the Lost Rivers, town officials should keep all at-risk properties in mind when a flood hazard is likely.

The map to the right shows the FEMA floodplain and the location of the CIKR that could be subject to flooding (small yellow house).



Using the same methodology that was used for flooding, CIKR falling within the Wildland Urban Interface (WUI) were reviewed. Identifying these facilities assists the team in creating wildfire mitigation action items and prioritizing those action items; it is important to determine which Critical Infrastructure & Key Resources are most vulnerable to wildfires.

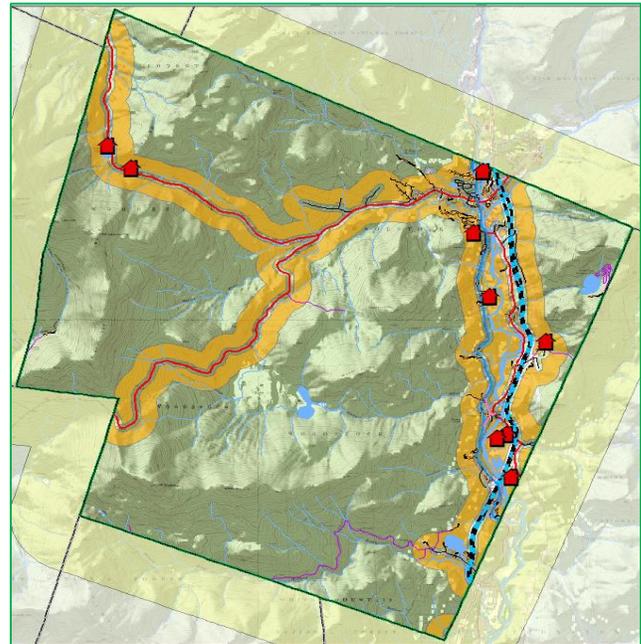
Table 3.1, The Hazard Identification & Risk Assessment, is used to evaluate the probability and the potential impact of all hazards.

Many structures were found to be in the traditional WUI, however, only nine CIKR were found in the WUI. These include three communications towers, one dam, the Bradley Airstrip, the Broken Branch-KOA, Waterst Campground and the White Mountains Motorsports Park. For the most part, each of these facilities, except for the two campgrounds, has ample defensible space and is unlikely to be impacted by wildfire.

The Wildland Urban Interface is the area in which humans interact with forested land. The map to the right shows the extent of the WUI when using the traditional method. This method uses a 300-foot buffer of all Class V roads and then another 1,320-foot buffer from the first buffer. The 1,320-foot buffer, or the Wildland Urban Interface, is indicated by orange shading. Susceptible CIKR are indicated with small red houses.

The rest of the town’s Critical Infrastructure & Key Resources were found to be within the 300 foot WUI buffer, therefore accessible by fire apparatus and hoses. However, because Woodstock is so heavily forested, all structures in town are considered to be in the Wildland Urban Interface. More information on wildfires is in Section C of this chapter.

ALL_H	NAME	Hazmit_Type
ERF	Potato Hill Cell Tower	Communications
ERF	Cox Farm Cell Tower	Communications
ERF	Grandview Cell Tower	Communications
ERFD	Beaver Pon Dam	Dam
ERFH	Bradley Airstrip	Helicopter Landing Zone
NERF	Deer Park Owners Association	Potential Shelter
FPP	Broken Branch-KOA	Campground
FPP	Waterst Campground	Campground
FPP	White Mt. Motorsports Park	Gathering of People



B. CALCULATING THE POTENTIAL LOSS

It is difficult to ascertain the amount of damage that could be caused by hazards because the damage will depend on the hazard’s extent and severity, making each hazard event somewhat unique. Therefore, we have used the assumption that hazards that impact structures could result in damage to either 0-1% or 1-5% of the town’s structures, depending on the nature of the hazard and whether or not the hazard is localized.

MS-1 Assessed Value of All Structures			
2019-MS1	Value	1% Damage	5% Damage
Residential	\$145,463,300	\$1,454,633	\$7,273,165
Manufactured Housing	\$4,369,490	\$43,695	\$218,475
Commercial	\$19,519,570	\$195,196	\$975,979
Tax Exempt	\$7,832,900	\$78,329	\$391,645
Utilities	\$4,226,540	\$42,265	\$211,327
Total	\$181,411,800	\$1,814,118	\$9,070,590
Woodstock 2019 Town Report			

Based on this assumption, the potential loss from any of the identified natural hazards would range from **\$0 to \$1,814,118** or **\$1,814,114 to \$9,070,590** based on the 2019 Woodstock town valuations, which lists the assessed value of all structures in Woodstock to be **\$181,411,800** (see chart above). Human loss of life was not included in the potential loss estimates but could be expected to occur depending on the severity and type of the hazard. Although descriptions are given for technological and human-caused hazards, no potential loss estimates for these hazards are provided in this plan.

C. NATURAL HAZARDS

Descriptions below represent the “**local impact**” to the community for the hazards that were identified by the team. For the “**extent**” of these hazards, please refer to *Appendix C, The Extent of Hazards*, which includes charts such as the Saffir-Simpson Hurricane Wind Scale, the Beaufort Wind Scale, the National Weather Service Heat Index, the Sperry-Piltz Ice Accumulation Index and the Enhanced Fujita Scale for tornadoes.

The “Hazard Identification & Risk Assessment (HIRA)” and the “Probability” noted for each hazard below are taken from analysis done in Table 3.1, *Hazard Identification & Risk Assessment (HIRA)*. The numbers preceding the hazard name in this section correspond to the numbers in Table 3.1 and are ordered by “Relative Threat”. The estimated loss is determined using the methodology and table that are explained in Section B of this chapter.

1) INLAND FLOODING

Hazard Identification & Risk Assessment (HIRA) High
 Probability Very High
 Estimated Structure Loss Value \$1,814,114 to \$9,070,590

General Flooding Conditions

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges or inadequate local drainage. Floods can cause loss of life, property damage, crop and livestock damage, and water supply contamination. Floods can also disrupt travel routes on roads and bridges.

Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of the year. A sudden thaw in the winter or a major downpour in the summer can cause flooding because there is suddenly an abundance of surface water with nowhere to go; warm temperatures and heavy rains cause rapid snowmelt producing prime conditions for flooding. Also, rising waters in early spring often break the ice into chunks that float downstream and pile up, causing flooding behind them. Small rivers and streams pose unique flooding risks because jams easily block them. Ice in riverbeds and against structures presents a significant flooding threat to bridges, roads and the surrounding lands.

100-Year Flood Events, Riverine Flooding, Road Flooding & Erosion (road)

Riverine flooding, 100-year flood events and local road flooding can occur as a result of hurricanes, tropical and post-tropical cyclones, as well as heavy summer and fall rains. It is estimated that the town experiences some sort of stormwater problem whenever there are two or more inches of rain in a short time. Heavy rain from tropical downpours, hurricanes or severe thunderstorms along with rapid snowmelt often cause culverts to be overwhelmed and roads to wash out. Today, with changes in land use, aging roads, designs that are no longer effective and undersized culverts, the risk of flooding is a serious concern. Inadequate and aging stormwater drainage systems create local flooding on both asphalt and gravel roads.

The heavy rains from Tropical Storm Irene in 2011 caused the closure of US Route 3, one of Woodstock’s major roadways and the main road through busy North Woodstock Village. Irene also caused damage to the town’s park and playground (Woodstock Family Park), scoured the riverbank on Lost River, eroded the roadway to the town’s wells and reservoir, and took out a man-hole which allowed water to go into the sewer plant, causing damage. The

town also lost two culverts on Reservoir Road, and the Lost River Valley Campground received flood damage. The White Mountains Motorsports Park was shut down due to flood damage, and the campground at the Motorsports Park “lost campers” into the Pemigewasset. Additional damage occurred at the Montaup Cabins and in many residences on South Main Street; other properties also suffered flood damage along US Route 3 and NH Route 175. To help pay for the cost of cleanup and damages, both FEMA and National Resource Conservation Services (NRCS) provided post-disaster funding.

During an extraordinary rain event on July 1-2, 2017 (DR-4329), Woodstock was once again hit with flood damage. During this event, flooding occurred at the White Mountains Motorsport Park, and the DPW Garage lost valuable land along the Pemi. The Woodstock Family Park was flooded, there was damage to the Sellingham Hill Road drainage ditch, and the northbound lane of NH Route 175 was partially washed out. Heavy rain uncovered the sewer lines leading to a break in the lines and the intake of water.

Another major rain event took place on October 29-30, 2017 (DR-4355); this storm also brought with it significant high winds. During this storm, trees and power lines fell, causing the closure of several of Woodstock’s roadways, including Tripoli Road, where people were trapped because of blowdowns. On US Route 3, a downed power line caused the road to be closed for a brief period of time. The playground flooded once again, and several areas along NH 175 flooded, including at the Green Bridge at Cox Farm Road and Susanne Place Drive. Woodstock applied for and received FEMA funding to repair the damaged playground.

More recently, yet another unusual rain event struck Grafton County. The July 11-12, 2019 storm (DR-4457), caused only minor damage in Woodstock. Woodstock did not submit a Request for Public Assistance (RPA) for this storm and therefore, has not received any post-disaster funding.¹³

Many roads in Woodstock are long and winding and subject to some of the most severe weather in the state. The continuous erosion of roads makes for a daunting task of “up-keep” for the Department of Public Works. Fortunately, four of the town’s major thoroughfares, NH Routes 112 and 175, US Route 3 and Interstate 93, are the responsibility of the state. The Department of Public Works maintains a total of 8.03 of Class V roads in the community, 4.16 miles of which are paved and 3.87 miles of which are gravel.

Over the past 25-30 years, local flooding and road washouts have occurred in many places in Woodstock. The areas of town that usually experience flooding include: South Main Street, sections of NH Route 175 (Green Bridge at Cox Farm Road, Susanne Place Drive, Sellingham Hill Road), the US Route 3 southbound on-ramp at exit 30 south to the Jack O’Lantern Resort, the Montaup Cabins, Resnick Circle, the Woodstock Family Park, NH Route 112 at the intersection of Hiltz Drive, the Lost River Valley Campground, the Waterest Campground, NH Route 112 at Lost River Hill, Profile Drive and the Woodstock Public Works Garage. For more information on erosion, see Item #10, Landslide & Erosion in this chapter.

Local Flooding as a result of Ice Jams

Flooding as a result of ice jams on the Pemigewasset has also occurred in Woodstock. Ice jam flooding typically occurs on NH Route 175 by Susanne Place Drive and north of Tripoli Road, and on NH Route 112 at Russell Farm Road.

¹³ HSEM email, Kayla Henderson, 11/20/20

Local Flooding as a result of Dam Failure

Flooding as a result of dam failure is a minor concern in Woodstock. However, there is some potential for damage to two houses should the dam at Mirror Lake (High Hazard) fail; a failure at Mirror Lake Dam could also hamper egress and emergency response. Failure of other dams, including the one at the Reservoir, Parker’s Dam and Beaver Pond Dam (Low Hazard), would not cause any damage to structures. The town has a copy of the Mirror Lake EAP. For more information on dam failure, see Section D, Item 5 in this chapter.

The expected loss value from flooding would be based not only on the cost to repair roadways but also the potential cost of damage to structures. Flooding can be severe enough to take out utilities and create areas of town that become inaccessible to emergency responders. The economic impact on the community, the loss of accessibility and the time and cost of road repair also factor into the estimate loss value. Therefore, the estimated loss value was determined to be between 1% and 5% of the total structure value.

2) SEVERE WINTER WEATHER

Hazard Identification & Risk Assessment (HIRA)	High
Probability	High
Estimated Structure Loss Value	\$1,814,114 to \$9,070,590

Snowstorms, Blizzards & Nor’easters

Heavy snowstorms typically occur from December through April. New England usually experiences at least one or two heavy snowstorms with varying degrees of severity each year. Power outages, extreme cold and impacts to infrastructure are all effects of winter storms that have been felt in Woodstock in the past. These impacts are a risk to the community, including isolation, especially of the elderly (14.8% of the population) and other vulnerable populations. The ability to get in and out of town and emergency service access can be hindered. Damage caused by severe winter snowstorms varies according to wind velocity, snow accumulation, duration and moisture content. Seasonal accumulation can also be as significant as an individual snowstorm. Heavy overall winter accumulations can impact the roof-load of some buildings. Significant snowstorms, nor’easters and blizzards could diminish food supplies within two days.

Recently, in both March 2017 and March 2018, snowstorms with unusually high spring accumulation received Major Disaster Declarations (DR-4316 and DR-4371). In both cases, the scheduled Town Meeting was held, and voting continued, despite the loss of power in some areas.

Although Woodstock’s road crew generally handles usual snow amounts without difficulty, Woodstock’s roads are often impacted by poor weather conditions, and, this combined with heavy traffic, can make travel difficult. Poor road conditions may hinder fire and other emergency response.

Ice Storms

Of more concern in Woodstock than 2-4’ snowstorms are ice storms, though the probability of the occurrence of a major ice storm is lower than that of a major snowstorm. A significant ice storm can inflict several million dollars’ worth of damage to forests and structures. Unlike typical snowstorms that are generally handled well by the DPW, ice storms present significant problems. Downed power lines and fallen trees make it difficult for the DPW and emergency responders. School buses are also at risk.

In December 2008, Woodstock experienced one of the worst ice storms in New Hampshire history (Major Disaster Declaration: DR-1812). Like other communities in New Hampshire, extended power outages and fallen trees resulted in hardship for the entire community. Power was out for most of the community for five days, and work crews were brought in from other communities to assist with the cleanup. Several roads were closed, including Main Street; the fuel pumps at the DOT shed had no electricity, so the town’s vehicles had to be filled in Thornton. FEMA funding was provided to assist with the cost of the cleanup after this devastating ice storm.

In Woodstock, no significant damage occurred during the 1979 or 1998 ice storms. In 2010, another ice storm struck southern New Hampshire, causing trees and power lines to fall once again, producing power outages in some areas for a few days. It was estimated that over 300,000 homes in the state were without power during this storm, but the damage in Woodstock was not as significant as it was during the 2008 ice storm.

Due to the widespread nature of severe winter weather, particularly from ice storms, the potential loss value is estimated to be between 1% and 5% of the total assessed value of all structures in town.

3) EXTREME TEMPERATURES

Hazard Identification & Risk Assessment (HIRA) High
Probability High
Estimated Structure Loss Value Not estimated

Extreme Cold & Heat

Winter temperatures can fall below -30°F, and summer temperatures, laden with high humidity can soar to nearly 100°F. In the past, there was more concern about extreme cold temperatures, but with improved heating systems and local communications, most New Hampshire residents can cope with extreme cold. Additionally, many New Hampshire residents have equipped their homes with generators and woodstoves, and many cities and towns offer warming centers or have established a functional needs list to check on vulnerable citizens.

Of concern today are extreme heat conditions, which seem to be more common with climate change; a heatwave with temperatures over 95° for a week or more, can have a substantial impact on the elderly and other vulnerable populations. Few residents, particularly vulnerable populations, have air conditioners and are less able to cope with extreme heat. The estimated elderly population in Woodstock is 14.8%, and the estimated poverty rate is 6.6% of the total population¹⁴. The team noted that in January 2018, there was a three week stretch of 10-30 degrees below zero; there was no injury or death related to this extreme cold stretch.

Extreme Temperatures combined with Long Term Utility Outage

Extreme temperatures, when combined with power failure, are of the most concern; power failure could result in no water, heat and air conditioning for the town’s most vulnerable populations. Town officials and the community as a whole should be concerned; they should look after its citizens to ensure that extreme temperatures do not create a life or property threatening disaster. To be proactive, the town has three spare generators to assist its residents. The town also keeps an up-to-date functional needs list to know who and where the vulnerable population is located, and they have designated a cooling & warming center for residents to use in the time of need.

¹⁴ US Census Bureau, American Community Survey, ACS, 2013-2017

The cost of extreme temperatures is difficult to calculate as it is not based on the loss of structures. The expected loss value would be primarily on the economic impact on the community and the time and cost of emergency response. Based on the assumption that damage would not occur to structures, the structure loss value due to extreme temperatures was not estimated.

4) TROPICAL & POST-TROPICAL CYCLONES

Hazard Identification & Risk Assessment (HIRA)	High
Probability	Moderate
Estimated Structure Loss Value	\$1,814,114 to \$9,070,590

Wind damage due to tropical and post-tropical cyclones (hurricanes) is a consideration because of the forest and valley floors in Woodstock. Like the 1938 hurricane and hurricanes Carol and Edna in 1954, major forest damage could occur. Although tropical and post-tropical cyclones could fit into several different categories (wind and flooding), the team considered tropical and post-tropical cyclones to be separate events. Tropical and post-tropical cyclones are rare in New Hampshire, but they should not be ruled out as potential hazards. In most cases, tropical cyclones have been down-graded to post-tropical cyclones by the time they reach northern New Hampshire.



Tropical Storm Irene, the remnants of Hurricane Irene, brought heavy rain and local flooding to Woodstock. Several trees were downed, as were some power lines. For most in the town, there was a brief loss of power; however, some residents experienced power outages for three to four days.

The major river in Woodstock is the Pemigewasset River, which generally experiences a small amount of river-rise during heavy rain events. However, tropical storms, such as Tropical Storm Irene in August 2011, can cause significant damage. Tropical Storm Irene caused the flooding of not only the Pemigewasset but also of other smaller rivers and streams and caused considerable damage to parking lots, roadways and bridges.

Irene caused damage to multiple structures and areas in Woodstock. Lost River Reservation, a major tourist attraction, had extensive damage to the boardwalk system. Maple Haven Campground, Waterest Campground and Lost River Valley Campground all experienced some degree of damage. Other tourist attractions, including the Jack O 'Lantern Condominiums, the HOB0 Railroad and the White Mountain Motor Sports Park, experienced a variety of impacts. Also, approximately thirty residences, businesses, cabins, multi-unit buildings and trailers experienced some sort of water issue. Woodstock has not experienced a tropical storm since Irene in 2011.

The probability that a tropical and post-tropical cyclone would remain a Category 1 or greater in this part of the state is low. Therefore, the potential loss value due to tropical and post-tropical cyclones was determined to be between 1% and 5% of the total assessed structure value.

5) HIGH WIND EVENTS

Hazard Identification & Risk Assessment (HIRA)	Medium
Probability	Moderate
Estimated Structure Loss Value	\$1,814,114 to \$9,070,590

Isolated High Wind Events

Isolated high winds and downdrafts often occur within Woodstock. These wind events are unpredictable and could fall timber, which in turn could block roadways, down power lines and impair emergency response. Old-growth software is affected by these unexpected windstorms, particularly in the spring, when the water table is high. As with other wind events, the emergency response could be hampered by fallen trees and power lines.

The town often experiences sporadic high winds due to its location in some of the high peaks of northern NH. During the October 29, 2017 storm, Woodstock experienced significant winds. People were trapped on Tripoli Road due to blow downs; there were power outages in parts of town, but only for a short time. NH Electric Coop has aggressively trimmed trees, particularly those near power lines, which could cause damage throughout the community, but the risk still exists. The team noted that high wind events are likely to occur at the highpoint on Lost River Road.

Tornadoes & Downbursts

The most significant difference between tornadoes, microbursts and macrobursts is the direction, size and location that the wind comes from, but all can cause significant damage. A tornado generally covers a large area, perhaps even several miles. It has winds that blow in a circular fashion leaving behind downed trees that lie in a swirling pattern. Straight-line winds and winds that burst downward are indicative of a microburst; the fallen trees that are left behind lay in roughly the same direction. A microburst must be 2.5 miles in width or less, whereas a macroburst is a similar wind event that is greater than 2.5 miles wide and generally lasts longer than a microburst.

In Woodstock, a microburst would be more likely than a tornado. Microbursts are becoming more common and often result in damage. In 2013 or 2014, a microburst took place near the Woodstock and Lincoln town line. Shingles were ripped off some roofs in Lincoln. Also, in 2018 a microburst on Lady Slipper Road cut down a large swath of trees, took down power lines and also crushed a backhoe. Lady Slipper Road experienced a loss of power for a short period of time.

Although the incidence of downbursts is becoming more common, damaging high wind events are relatively uncommon natural hazards in New Hampshire. On average, only about six tornadoes touch down each year. Damage from high wind events largely depends on where the hazard strikes. If a high wind event were to strike a densely populated or commercial area, the impact could be significant and could result in personal injury and property damage. However, due to the rareness of tornadoes and the localized nature of downbursts, the potential loss value was determined to be between 1% and 5%.

6) WILDFIRES

Hazard Identification & Risk Assessment (HIRA)	Medium
Probability	Moderate
Estimated Structure Loss Value	\$1,814,114 to \$9,070,590

There are two main potential losses with a wildfire, the forest itself and the threat to the built-up human environment and structures within the Wildland Urban Interface (WUI). In many cases, the only time it is feasible for a community to control a forest fire is when it threatens the built-up human environment.

Any wildfire discussion must include a discussion of the Wildland Urban Interface (WUI). The WUI can be determined in a variety of ways; however, it generally represents the area in which the forest and human habitation intersect. At times the WUI is defined as the area out of reach of available fire hoses and water resources, while other times, it is determined to be areas with substantial tree cover and limited egress. For most northern New Hampshire communities, entire towns are considered to be in the WUI because of the abundance of hardwood and softwood trees. In more populated areas, the WUI is often determined to be in densely populated neighborhoods where a large canopy of old-growth trees and limited access make people and structures more vulnerable. All structures within the WUI are assumed to be at some level of risk and, therefore, vulnerable to wildfire.

The potential exists for wildfires throughout Woodstock. Currently available documentation on fires in Woodstock and New Hampshire indicates that the majority of fires are human-caused, including the Dilly Cliff Fire, which happened in Woodstock on October 3, 2017. Officials believe "...that a leftover campfire or discarded cigarette could be the cause"¹⁵ of the fire, which burned 72 acres. The fire took over 100 firefighters from all over the state, a state helicopter and two Blackhawk helicopters dumping 300 gallons of water to get it under control. Forest Service officials eventually decided to let the fire burn until the first snowfall. There was no structure damage or affect to humans in this fire, besides the closing of hiking trails. Also, in 2017 the fire department fought a 200-300 yard embankment fire along Route 3. Otherwise, fires in Woodstock have been small brush fires of little significance. The team noted that more buildings are being built in the Wildland Urban Interface (WUI), which could add to the possibility of future wildfires.

The team described the forests of Woodstock as consisting of primarily a combination of softwoods and northern hardwoods. With a low probability of drought and high humidity, it was felt that most fires are "duff" fires, the burning of *"the layer of decomposing organic materials lying below the litter layer of freshly fallen twigs, needles, and leaves and immediately above the mineral soil."*¹⁶ Burn permits are required in Woodstock, as they are throughout the state, but often burning takes place without the proper permits. The steep terrain and heavily forested areas of the town are difficult to monitor; therefore, the occasional unauthorized burn will take place.

Due to the abundance of slash on the forest floor left by past ice storms, logging operations, blowdowns and the mixture of hardwood and softwood trees throughout the northern forests, there is potential for fast-burning fuels, and a wildfire could potentially occur. Also, the recreational use of woods-trails by snowmobilers, ATV operators, campers and other outdoor enthusiasts creates an opportunity for sparks and out-of-control fires to ignite the town's forested areas. To help combat fire, Woodstock maintains and improves firefighting equipment, continuously maintains dry hydrants and fire ponds and performs brush cutting where needed.

¹⁵ Steve Sherman (Forest Protection Bureau Chief) - <https://www.nhpr.org/post/nh-officials-dilly-cliff-forest-fire-caused-humans#stream/0>

¹⁶ <http://www.fs.fed.us/nwacfire/home/terminology.html>

Large wildfires in New Hampshire are uncommon; however, four substantial fires have occurred in the state in recent years. These include the Dilly Cliff Fire in Woodstock (mentioned above), the Covered Bridge Fire in Albany, the Stoddard Fire in Stoddard, and the Bayle Mountain Fire in Ossipee. Given the right set of conditions (drought, lightning, human interface), the potential for wildfires is good. Because the Town of Woodstock is heavily forested, the potential loss value was determined to be between 1% and 5% of the total assessed structure value.

7) LIGHTNING

Hazard Identification & Risk Assessment (HIRA)	Medium
Probability	Low
Estimated Structure Loss Value	\$0 to \$1,814,114

Lightning

Severe lightning as a result of summer storms or as a residual effect from hurricanes and tornadoes has occurred in Woodstock. Some of the town’s structures are older buildings, and as such, could ignite much faster due to a lightning strike than newer buildings. Many of these older buildings are located along Main Street.

Other vulnerable structures are surrounded by forest. Dry timber on the forest floor, some of which remains from past ice or windstorms, and the age of many buildings and out-buildings combined with lightning strikes can pose a significant disaster threat. Lightning could do damage to specific structures, injure or kill an individual, but the direct damage would not be widespread.

Although lightning is a potential problem, the town reports few occurrences, none of which were severe. Woodstock is also home to one golf course, but no injury-producing or damaging lightning strikes have been reported.

It was noted that severe thunder and lightning storms seem to happen more often in recent years, perhaps the result of climate change. Also concerning are the heavy rains that thunderstorms can produce and the subsequent erosion of ditches and roadways.

Hail

Although not common in Woodstock, hailstorm events resulting from significant thunder and lightning storms can occur at any time. Summer storms may produce hail large enough to damage roofs, siding and automobiles. Damage from hail could also result in failed crops, thus creating an economic impact on the local economy and individual citizens. It should be noted, however, that Woodstock is not a heavily farmed community. Overall, it was felt that a hailstorm event would be unlikely and would cause minimal damage.

The last hailstorm in Woodstock was on July 17, 2017. During this event, some residents experienced roof and siding damage along with vehicle damage.

Based on the localized nature of lightning strikes and the minimal damage that can be expected from hail, the potential loss value was determined to be 0-1% of the total assessed structure value.

8) EARTHQUAKES

Hazard Identification & Risk Assessment (HIRA) Medium
 Probability Very Low
 Estimated Structure Loss Value \$1,814,114 to \$9,070,590

Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines and are often associated with landslides and flash floods. Two earthquakes with a magnitude greater than 5.0 have occurred in New Hampshire since 1940; both occurred in Ossipee in December of 1940 (5.5-5.8). Three earthquakes with a magnitude greater than 4.0 have occurred since 1982, one in Laconia (4.0), one in Berlin in 1988 (4.0) and another in Berlin in 1989 (4.1). The most recent earthquake to be felt by many New Hampshire residents occurred in October 2012, with its epicenter in Hollis Center, ME, just over the NH state line. The team noted that the Hollis earthquake was felt in Woodstock, but no damage occurred.

It is well documented that fault lines are running throughout New Hampshire, but high magnitude earthquakes have not been frequent in New Hampshire history. More recently, many small earthquakes have occurred, but none of these were felt in Woodstock (see Table 3.2).

Although historically, earthquakes have been rare in northern New Hampshire, the potential does exist, and depending on the location, the impact could be significant. Therefore, the potential structure loss value due to earthquakes was determined to be between 1% and 5% of the total assessed structure value.

9) INFECTIOUS DISEASES

Hazard Identification & Risk Assessment (HIRA) Low
 Probability Low
 Estimated Structure Loss Value Not estimated

“Infectious diseases are disorders caused by organisms — such as bacteria, viruses, fungi or parasites. Many organisms live in and on our bodies. They’re normally harmless or even helpful, but under certain conditions, some organisms may cause disease.



Some infectious diseases can be passed from person to person. Some are transmitted by bites from insects or animals. And others are acquired by ingesting contaminated food or water or being exposed to organisms in the environment.”¹⁷

Woodstock’s unique geography of mountains, rivers and lakes provides summer and winter recreation enthusiasts many opportunities to visit the town. The community’s population shows a significant increase during the summer and winter weekends. In addition, the town’s school students attend school in the neighboring town of Lincoln, thus enabling infection and viruses to be transmitted from elsewhere.

¹⁷ Infectious diseases, Overview, <https://www.mayoclinic.org/diseases-conditions/infectious-diseases/symptoms-causes/syc-20351173>

Because of these factors, the team decided that infectious diseases and epidemics or pandemics could present a possible threat to Woodstock. With the occurrence of world-wide pandemics such as SARS, the Zika Virus, H1N1 and Avian Flu, Woodstock could be susceptible to an epidemic and subsequent quarantine. In fact, as of the writing of this plan, the entire world is coping with the COVID-19 pandemic. All non-essential businesses and schools throughout New Hampshire and most of the United States were closed during the early months of the pandemic.

To help mitigate the crisis, town officials closed the Town Office to the public, still doing business either remotely, online, or by appointment, reopening with restrictions during the summer. The town continues to encourage social distancing, the use of face masks and the protection of the town’s most vulnerable. As of November 19, 2020, NH DHHS reported 1-4 COVID-19 active cases in Woodstock; cumulatively, Woodstock was report to have five cases. The state reported 16,277 cases of COVID-19 and 506 deaths, as seen in the chart the right.¹⁸

Number of Persons with COVID-19 ¹	16,277
Recovered	11,765 (72%)
Deaths Attributed to COVID-19	506 (3%)
Total Current COVID-19 Cases	4,006
Persons Who Have Been Hospitalized for COVID-19	826 (5%)
Current Hospitalizations	98

As part of our discussion about infectious disease, it makes sense to discuss the opioid epidemic that is affecting the state and the nation in general. According to the National Institute on Drug Abuse, *“New Hampshire has the second highest rate of opioid-related overdose deaths in the country. In 2016, there were 437 opioid-related overdose deaths...from 2013 through 2016, opioid-related deaths in New Hampshire tripled”*¹⁹.

Like many New Hampshire communities, Woodstock has also struggled with the use of opioids. Although the availability and use of NARCAN[®] have helped lower the death rate in New Hampshire, opioid-related overdose deaths are still a common occurrence. In the 2019 Annual Report, the Police Department statistics state that drug-related incidents numbered 40 in 2019, a marked increase from 22 in 2018 and six in 2017.²⁰ In the Health Officer’s report, the Health Officer states, *“Substance abuse continues to be an ongoing problem within the Town of Woodstock and throughout the State of New Hampshire. If you know a friend or family member who needs help, please encourage them to seek it before it’s too late. A list of some available resources for assistance can be found on the Woodstock Police Department webpage.”*²¹

The team felt that an epidemic or pandemic, such as the pandemic we are experiencing today, will continue to pose a threat to the citizens of the community. However, because there would be no direct impact to structures within the town, the structure loss value was not estimated. Woodstock’s emergency service personnel continue to maintain extensive pandemic planning to prepare for and respond to infectious diseases.

¹⁸ <https://www.nh.gov/covid19/index.htm>

¹⁹ NH Opioid Summary, National Institute on Drug Abuse; <https://www.drugabuse.gov/drugs-abuse/opioids/opioid-summaries-by-state/new-hampshire-opioid-summary>

²⁰ Annual Report, page 55, https://www.woodstocknh.org/sites/g/files/vyhlf1471f/uploads/woodstock_town_report_-_web.pdf

²¹ Annual Report, page 40, https://www.woodstocknh.org/sites/g/files/vyhlf1471f/uploads/woodstock_town_report_-_web.pdf

10) LANDSLIDE & EROSION

Hazard Identification & Risk Assessment (HIRA) Low
Probability Low
Estimated Structure Loss Value \$0 to \$1,814,114

Landslides, rockslides, and mudslides are often associated with heavy rains, steep terrain, and the overflow of river banks. Woodstock has been impacted by these types of events in the past.

Erosion and the subsequent loss of land along the river banks, road washouts, overburdened culverts and changes in the course of rivers have been some of the erosion issues in Woodstock. Heavy stream flooding often causes culverts to be overwhelmed and roads to wash out. Lack of planning, improper road design and undersized culverts add to the risk of erosion along Woodstock's roadways.

Woodstock experiences erosion along the banks of the Pemigewasset whenever there is a significant change in the river's water level. In particular, the riverbanks alongside the DPW garage are subject to erosion and the subsequent loss of land, thus threatening the highway garage and the equipment stored there. Action Item #27 addresses this issue and the need to relocate the facility.

Other issues of erosion are also addressed in this plan. Action Items #21 and 22 address road erosion on Thornton Gore Road and Gray Squirrel Road. These action items call for culvert improvements to improve the flow of stormwater and prevent future road erosion. Also, Action Item #28 calls for the replacement of the aging water line along Route 3 in lower Woodstock to prevent sinkholes and road erosion.

Kinsman Notch is the one area of Woodstock that the team felt had the potential for a landslide. NH Route 112 passes through Kinsman Notch, a section of the road which cuts through the mountains of the Kinsman Range. In this "Notch," there is some potential for landslide; however, there have been no reported events.

Although landslide and erosion are not widespread hazards, the DPW garage is indeed in harm's way for erosion. Therefore, the structure loss value due to erosion was estimated to be between 0% and 1% of the total assessed structure value.



*The Pemigewasset River near the Woodstock Highway Garage
Photo Credits: MAPS*

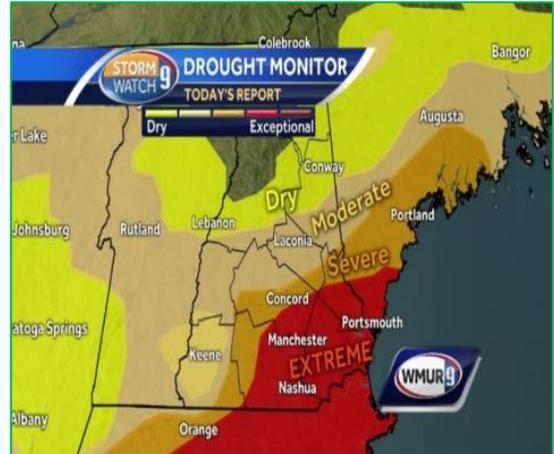


11) DROUGHT

Hazard Identification & Risk Assessment (HIRA) Low
 Probability Very Low
 Estimated Structure Loss Value \$0 to \$1,814,114

An extended period without precipitation, or drought, could elevate the risk for wildfire and blowdowns in the forested areas of the community. With an extreme drought, the water supply and aquifer levels could be threatened. Woodstock’s residents rely on both public water and private wells. Fortunately, significant droughts rarely occur in New Hampshire or Woodstock. According to the NH Department of Environmental Services, only six significant droughts had occurred since 1929²², including the drought of 2016 (see Table 3.2).

The 2016 drought in New Hampshire was significantly worse in the southern part of the state than in the northern region. The image to the top-right from WMUR-TV in September 2016 shows drought conditions in New Hampshire during the summer of 2016²³.

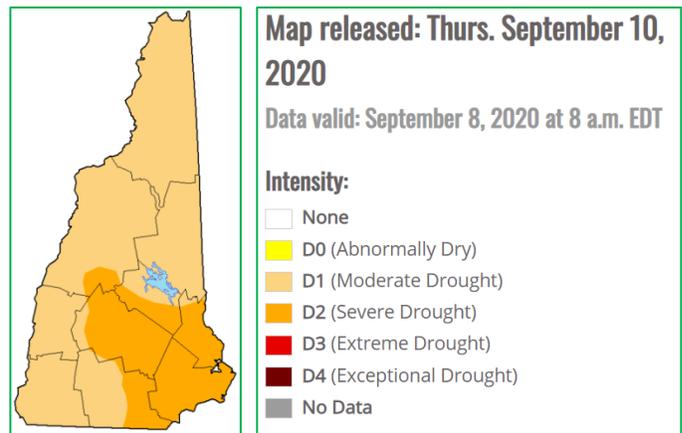


WMUR Archives; September 15, 2016

Fortunately, the 2016 drought did not significantly impact Woodstock; the team did not report any wells drying up. The 2016 drought continued into 2017 with dry conditions throughout the summer in some communities, but the impact was even less significant than the prior year.

As of September 8, 2020, Grafton County and Woodstock were in “moderate drought” conditions, as seen in the image to the right.²⁴

The cost of future droughts in Woodstock is difficult to calculate as any cost would likely result from an associated fire, crop loss and diminished water supply. Based on these assumptions, the loss value was estimated to be between 0% and 1% of the total assessed structure value.



²² NH DES; <http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf>

²³ <https://www.wmur.com/article/extreme-drought-conditions-worsen-in-new-hampshire/5269231>

²⁴ <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?NH>

D. TECHNOLOGICAL HAZARDS

The following technological hazards were also considered while developing this hazard mitigation plan. Though these hazards are not analyzed in more detail as part of this plan, they are nonetheless worth mentioning as real and possible hazards that could occur in Woodstock. The estimated structure loss was not determined for technological hazards.

1) CONFLAGRATION

Hazard Identification & Risk Assessment (HIRA) Medium
Probability Low

“Conflagration is an uncontrolled burning that threatens human life, health, property or ecology. A conflagration can be accidentally or intentionally created”²⁵

In Woodstock, the risk of a large uncontrolled fire is particularly threatening in the downtown area where there is a high density of older properties and businesses. There are multiple restaurants, apartments and stores along Main Street, which are all of significant age and are very close together. These factors, when combined with high winds and a lack of water resources, could potentially result in a large uncontrolled fire that could spread from building to building across the downtown area. A large fire of this sort could result in explosion(s), affect the transportation infrastructure, hamper communication and power systems and shut down the numerous businesses along Main Street.

The impact on communication, power and transportation would likely be temporary, but damage to homes and businesses could be significant.

2) LONG TERM UTILITY OUTAGE

Hazard Identification & Risk Assessment (HIRA) Medium
Probability Low

Long term utility outages of five or more days have occurred in Woodstock, both as a result of local line damage from high winds and storms and problems with the power grid. If a major or extended power outage occurs and lasts for more than a week, a significant hardship on individual residents could result, particularly those citizens who are elderly, disabled or poor. The team reported that long term power outages have diminished as a result of continued efforts by public utility companies to trim trees and branches near power lines, but the problem still exists.

Long term utility outage is a concern, particularly when combined with any of the natural hazards detailed above. However, the team felt that many residents were somewhat self-sufficient, as many are now equipped with generators and woodstoves. The most significant impact from an expended power failure would be the inconvenience caused by the inability to pump water for residents who rely on wells. It is also noted that driving can be difficult due to weather conditions and steep terrain and that virtually all services, including pharmacies and grocers, are located out of town.

²⁵ Fire Definitions; HotAsBlazes.com

As a small, close-knit community, town officials are aware of persons who may need help in emergencies. Nonetheless, a long term utility outage causing frozen pipes and a lack of heat and water is potentially a serious hazard for the community.

3) HAZARDOUS MATERIALS

Hazard Identification & Risk Assessment (HIRA) Low
 Probability Very Low



Hazardous material in fixed locations is a concern in many of New Hampshire’s communities. Manufacturers, gas stations, fuel depots, small businesses and even homes can be found to have hazardous chemicals, explosive materials or poisons on site. Breaches in the storage, use, production or disposal can affect the groundwater, aquifers and water supply of a community as well as the air we breathe.

Woodstock has two areas that were noted as susceptible to damage from a fixed hazardous material event. These include, but are not limited to, propane and other petroleum product storage at Dead River on Old Dump Road. Also of concern is Spray Foam on Route 3 that has highly flammable chemicals.

If the ignition of hazardous materials were to take place, entire buildings could be susceptible to explosion and fire. If a massive explosion were to occur at the Dead River facility, there could be significant damage to houses, infrastructure and natural resources.

4) AGING INFRASTRUCTURE

Hazard Identification & Risk Assessment (HIRA) Low
 Probability Very Low

“Infrastructure is the backbone of our community. While we don’t always acknowledge it, the condition of our infrastructure has a very real impact on our lives. We all depend on roads and bridges to get us where we are going, water infrastructure that delivers clean on-demand water, electricity to light our home and office, and schools that will facilitate a learning environment.”²⁶



Aging infrastructure is the continued deterioration of roads, bridges, culverts, ports, railroads, wastewater facilities, airports, dams, utilities and public water and sewage systems. The American Society of Civil Engineers gave NH a C- rating overall in its 2017 report card.²⁷ The State Multi-hazard Mitigation Plan states that the average lifespan of a bridge is 50 years; the current average age of state-owned bridges in New Hampshire is 52-56 years.²⁸

Aging infrastructure is a concern in Woodstock as it is throughout New Hampshire and the United States. In Woodstock, of particular concern are the old firehouse, the Town Shed and the older buildings that line Main Street.

²⁶ <https://www.infrastructurereportcard.org/wp-content/uploads/2016/10/2017-NH-Report-Card-hq-with-cover.pdf>
²⁷ Ibid
²⁸ NH Multi-hazard Mitigation Plan, 2018, page 156

5) DAM FAILURE

Hazard Identification & Risk Assessment (HIRA) Low
Probability Very Low

As previously state, dam failure is a minor concern in Woodstock. The town has four dams, including Mirror Lake Dam (High Hazard), Beaver Pond Dam (Low Hazard), Parker’s Dam and the Old Reservoir Dam. A failure of Parker’s Dam would not affect any structures or infrastructure. Beaver Pond Dam has recently been rebuilt, so barring a major disaster, this dam is safe from failure. Mirror Lake Dam is the most concerning for the town; if this dam fails, floodwaters could potentially damage two houses, could hamper egress of residents and hinder the emergency response. There is no potential mitigation for Mirror Lake Dam and the town does not consider this dam to be an unacceptable risk at this time. The town has a copy of the EAP for Mirror Lake Dam and will notify the residents of the only two susceptible homes should a dam failure or breach be suspected.

Although structure damage could occur with the failure of the town’s dams, overall, the risk related to dam failure would primarily be for minor road washouts.

E. HUMAN-CAUSED HAZARDS

The following human-caused hazards were also considered while developing this hazard mitigation plan. Though these hazards are not analyzed in more detail as part of this plan, they are nonetheless worth mentioning as real and possible hazards that could occur in Woodstock. Estimated structure loss was not determined for human-caused hazards.

1) TRANSPORT ACCIDENTS

Hazard Identification & Risk Assessment (HIRA) High
Probability Moderate

Interstate 93 (I-93), US Route 3, NH Route 112 and NH Route 118 are often traveled by trucks and busses carrying goods and people to and from other parts of the state. Some of Woodstock’s roads are narrow and winding and subject to severe winter weather; when affected by flooding, winter snow conditions and ice, they become treacherous. In these conditions, vehicular accidents, wildlife collisions and truck accidents involving hazardous materials are always a possibility. A major ice storm or another significant event could make egress and access difficult for individuals and first responders. All roadways in Woodstock are susceptible to hazards such as road flooding and high winds leading to downed trees in the roadways and potential hazardous materials spills.

The possibility of vehicular accidents involving hazardous materials is identified as a significant hazard in Woodstock. The town has several major roads, including I-93, US Route 3, NH Route 112 and NH Route 118. In particular, NH Routes 112 and 118, which run east-west through the entire town, experience heavy vehicular traffic daily and are steep and very twisty in places. I-93 experiences heavy traffic volumes, a lot of which are semi-trucks carrying unknown substances at high rates of speed. A rollover on I-93 could create a major disaster for the town and its residents. Factors affecting the likelihood of a vehicular accident involving hazardous material include icy roads, snow accumulation, heavy rains and other environmental factors.

Depending on the location of a hazardous material accident, the losses could be relatively high. However, losses are expected to be localized and unlikely to happen in a densely populated part of town.

2) MASS CASUALTY INCIDENTS

Hazard Identification & Risk Assessment (HIRA) High
Probability Moderate

A Mass Casualty Incident is a situation where the number of casualties exceeds the emergency resources that are typically available locally. MCIs have been known to occur as a result of bus, auto, train and aircraft accidents, and incidents involving large crowds. MCIs can also be a result of natural hazards such as hurricanes, floods, earthquakes and tornadoes.

Woodstock’s busy highways are twisty and steep and are subject to animal crossings and poor weather conditions. Added to these conditions is the seasonal influx of tourists as well as a high volume of tour busses visiting Woodstock during Fall Foliage. A Mass Casualty Incident could happen anywhere, but more likely on I-93, US Route 3, NH Route 112 or NH Route 175.

3) CYBER EVENTS

Hazard Identification & Risk Assessment (HIRA) Medium
Probability Low

Presidential Policy Directive (PDD-41) describes a cyber incident as “An event occurring on or conducted through a computer network that actually or imminently jeopardizes the integrity, confidentiality, or availability of computers, information or communications systems or networks, physical or virtual infrastructure controlled by computers or information systems, or information resident thereon. For purposes of this directive, a cyber incident may include vulnerability in an information system, system security procedures, internal controls, or implementation that could be exploited by a threat source.”²⁹

With the increased use of computers and the internet, cyber events could include targets such as banks, hospitals, schools, churches, town, city and state government operations, emergency operations and critical infrastructure. Cyber events have been known to take place almost anywhere, from very small towns to large facilities in New Hampshire, causing large expenditures, disruption in everyday business practices and the loss of data.

The Woodstock planning team did not report any cyber-attacks, but the threat is certainly real. Added security on computer networks and user education on cyber threats are essential to protect sensitive town information and data.

4) TERRORISM & VIOLENCE

Hazard Identification & Risk Assessment (HIRA) Medium
Probability Very Low

Terrorism is a concern throughout our country and the world, but Woodstock is not host to any known soft-targets. Of concern in Woodstock is White Mountain Motorsport Park, a race track with regular occurrences of events. The race track has large gatherings of people and many types of fuels that could ignite in the right conditions. The team also noted that occurrences of domestic violence have taken place as well as an opioid death in 2015. As with many small towns, the terrorism threat is minimal; if a terrorist incident were to occur, it would most likely be a home-grown terrorist event.

²⁹ PDD-41; <https://obamawhitehouse.archives.gov/the-press-office/2016/07/26/presidential-policy-directive-united-states-cyber-incident>

Chapter 6: Current Policies, Plans & Mutual Aid

A. ANALYSIS OF EFFECTIVENESS OF CURRENT PROGRAMS

After researching historic hazards, identifying CIKR and determining potential hazards, the team determined what is already being done to protect its citizens and structures. Once identified, the team addressed each current policy or plan to determine its effectiveness and to determine whether or not improvements were needed. This analysis became one of the tools the team used to identify mitigation action items for this plan.

With the knowledge of what regulations Woodstock currently had in place, creating new action items was less difficult. This process helped identify current plans and policies that were working well and those that should be addressed as a new “Action Item” as well as the responsible departments. The table that follows, *Table 6.1, Policies, Plans & Mutual Aid*, shows the analysis that resulted from discussion with the team.

Existing policies, plans and mutual aid that were designated as “Improvements Needed” were added to **Table 9.1, Mitigation Action Items** as new strategies and were reprioritized to meet the current needs of the town.

TABLE 6.1: CURRENT POLICIES, PLANS & MUTUAL AID

KEY TO EFFECTIVENESS:

- Excellent**..... The existing program works as intended and is exceeding its goals.
- Good** The existing program works as intended and meets its goals.
- Average** The existing program does not work as intended or does not meet its goals.
- Poor** The existing program does not work as intended, often falls short of its goals or may present unintended consequences.

Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
CodeRED & School Alert System	CodeRED is a reverse calling warning system that uses listed phone numbers. CodeRED does not include cell and unlisted numbers or email addresses. The Linwood School uses the "Blackboard Connect" reverse calling system and is used for school activities as well as emergency notification.	Townwide	Emergency Management Director	Excellent	Improvements Needed: CodeRED is an excellent warning system, but it only stores phone numbers that are listed in the phone book. The town provides information to residents on CodeRED through the town's website. This is deferred to continue to provide public outreach to encourage all residents to contact CodeRED to add cell numbers, emails, unlisted numbers, and to verify the information. Use the website, a possible brochure at the Town Office, social media platforms or a sign up at Town Meeting. Action Item #12 (Also in Table 7.1)
Emergency Operation Plan (2014)	This plan identifies the response procedures and capabilities of the Town of Woodstock in the event of a natural, technological or human-caused hazard.	Townwide	Emergency Management Director	Excellent	Improvements Needed: The Woodstock Emergency Operations Plan (EOP) was last updated in 2014 and has passed the recommended 5-year expiration. An updated EOP will include an EOC Call Alert List as well as a detailed Resource Inventory List and Player Packets and adhere to the state's 15-ESF template. This is deferred to this plan to update the EOP as soon as possible. Action Item #19 (Also in Table 7.1)

Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
Master Plan (2014)	A Master Plan includes goals, objectives and expectations for the future development of the town	Townwide	Planning Board	Excellent	Improvements Needed: The Woodstock Master Plan was last updated in 2014 and will be ready for a recommended complete in 2024, which is within the scope of this plan. This is deferred to update the Master Plan according to the state's 10-year recommendation and to consider including a Natural Hazards Section and mitigation items from this plan in any future updates. Action Item #5 (Also in Table 7.1)
NIMS & ICS Training	The National Incident Management System (NIMS) and the Incident Command System (ICS) provide training that can help ensure effective command, control, and communications during emergencies	Townwide	Emergency Management Director	Poor	Improvements Needed: Most first responders have done NIMS & ICS training. Although this is preparedness, this is deferred to this plan to continue to provide NIMS (IS-700) & ICS (ICS 100 & ICS 200) training to new first responders and new town officials as they become elected or appointed. Action Item #7 (Also in Table 7.1)
School Emergency Operations Plan (SEOP)	A School Emergency Operations Plan guides response to emergencies in the school.	Linwood School	School Board, Police, Fire & Emergency Management Director	Poor (for exercises)	Improvements Needed: The Linwood School has completed the school's Emergency Operations Plan according to the annual requirements of the state. The School's plan is current and will be updated in the future, according to the state's requirements. Drills and exercises are done periodically and include the participation of the town's emergency responders. Although this is preparedness, this is deferred to continue to work with the school on future plans, training and exercises. Action Item #16 (Also in Table 7.1)
Hazardous Materials Response Team	A Hazardous Materials Response Team is a specialized team of individuals who have the skill and expertise to manage HazMat related incidents successfully. Most local fire departments are trained to offer a "defensive position" until HazMat experts arrive on the scene.	Townwide	Fire Department	Average	Improvements Needed: Although Woodstock does not have a HazMat Team, Firefighters are trained in the basic response to a HazMat incident and are adept at maintaining perimeters until specialized teams arrive. The Woodstock EMD or the Fire Chief would most likely call dispatch, who would then contact the state to request an available HazMat Response Team. Although this is preparedness, this is deferred to this plan to continue HazMat training for the members of the Woodstock Fire Department. Action Item #8 (Also in Table 7.1)
Radio Communications	All three Emergency departments in Woodstock (Police/Fire/DPW) have radio interoperability.	Townwide	Emergency Management Director	Poor	Improvements Needed: Although radio communications systems in Woodstock are interoperable, there are still "dead" spots within the community. This is deferred to this plan to again research and obtain repeaters to help eliminate "dead" spots in the town's communication system. A new cell tower is planned in Woodstock on Harley View Road; space will be provided for emergency communication. Action Item #26 (Also in Table 7.1)

Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
National Flood Insurance Program (NFIP) & Flood Ordinance (2014)	The minimum National Flood Insurance Program (NFIP) requirements (Section 60.3(c)) have been adopted. Woodstock has been a member of the NFIP since May 5, 1991. The Flood Ordinance regulates all new and substantially improved structures located in the 100-year floodplain, as identified on the FEMA Flood Maps dated February 20, 2008.	Floodplain	Planning Board & Select Board	Good	Improvements Needed: The town's Flood Ordinance works well to successfully prohibit or force compliance to the ordinance for building and substantial improvements to structures within the FEMA flood zone. The Flood Ordinance was last amended in 2014 and is reviewed and updated every three years as part of the Subdivision Regulations. This is deferred to this plan to continue compliance with the National Flood Insurance Program, obtain NFIP brochures to have available at the Town Office and to provide public outreach regarding the benefits of membership in the NFIP, whether or not properties are in the FEMA floodplain. Also deferred to provide robust information on flood mitigation techniques that can be taken to protect individual homes and properties and links to the NFIP, ready.gov and other pertinent websites. Action Item #10 (Also in Table 7.1)
Subdivision Regulations (2011)	The purpose of subdivision regulations is to provide for the orderly present and future development of the town by promoting the public health, safety, convenience and welfare of the town's residents.	Townwide	Planning Board	Good	Improvements Needed: The Woodstock Subdivision Regulations, most recently updated in 2011, are in good shape. The Subdivision Regulations address set-backs for homes and driveways, steepness of roads and road frontage. The regulations do not address the availability of water resources for fire suppression or regulations on the steepness for buildings and driveways or maintaining adequate stormwater flow to prevent flooding. This is deferred to review the Subdivision Regulations to discuss changes that will reduce the chance of hazards. Action Item #24 (Also in Table 7.1)
Culvert & Stormwater Maintenance Plan	A Culvert & Stormwater Maintenance Plan includes an inventory of all culverts and ditches in the community along with a record of the location, size, etc. The Woodstock Department of Public Works and the State DOT clean the drainage basins once a year and after major flooding events and culverts are repaired as needed.	Townwide	Department of Public Works	Good	Improvements Needed: Although the Woodstock Public Works Department does a good job cleaning and repairing drainage basins and culverts, a written Culvert & Stormwater Maintenance Plan should be developed to ensure continuity of actions and efficient stormwater management. This is deferred for continued maintenance and the development of a written Culvert & Stormwater Maintenance Plan detailing such items as the size, material, date of installation, recommended date for improvement, GPS location and any problems associated with the location (i.e., flooding). Several culverts and drainage systems in Town need improvement. Action Items #1, #18, #21 & #22
Multi-Hazard Mitigation Plan (2014)	Addresses all potential hazards, natural, human-made and wildland fires	Townwide	Emergency Management Director	Good	Improvements Needed: The Woodstock Hazard Mitigation Plan (2014) is being updated with this plan. This is deferred to review the Hazard Mitigation Plan 2020 on an annual basis, review the Action Items and update the plan again in 2024. Action Item #17

Current Program or Activity	Description	Area of Town Covered	Managing Department	Effectiveness	Improvements or Changes Needed
Central NH CERT/MRC Unit	A Citizens Emergency Response Unit (CERT) provides assistance during emergencies.	Townwide	Central NH CERT/MRC Units	Good	Improvements Needed: The Central NH CERT/MRC Units has been established by the Central NH Regional Public Health Network. The Woodstock EMD should promote citizen involvement in the regional CERT/MRC Units. Action Item #11
Fire Department Training	Fire and EMS training for wildfire suppression and other fire-related issues.	Fire Department and other locations in the state	Fire Chief, Fire Warden & Emergency Management Director	Excellent	Improvements Needed: Training of all fire responders is coordinated by the Fire Chief and includes the many aspects of emergency response. Training is done through the Twin State Fire Mutual Aid, the Woodstock Fire Department and the NH Fire Academy. This is deferred for continued training through 2024. Action Item #9
Building Code & Permits	The town has adopted BOCA (Builders Officials Code Administrators International). It does require builders to follow these codes for new construction so that national standards for flood, wind, earthquake, fire and snow load are met.	Townwide	Select Board & Planning Board	Good	Improvements Needed: The Town of Woodstock has a Building Inspector (not code compliant). The permitting process requires builders to abide by BOCA codes, which have been adopted by the State of New Hampshire and the town. This is deferred to this plan to review the building permit process for improvements to reduce the risks from natural hazards. Action Item #23
Tree Removal Program	Tree Removal Program to reduce damage from fallen trees and limbs to power lines and structures	Townwide	Department of Public Works	Good	Improvements Needed: As trees become damaged and threaten power lines and structures on town roads, the DPW removes them. The NH DOT and the NH Electric Coop do this for state roads as needed. This is deferred to continue local tree removal efforts to help mitigate the effects of high wind events, ice storms and other natural hazards. Action Item #2
Functional Needs List	A list of citizens who may need special attention in the event of a disaster	Townwide	Police	Good	Improvements Needed: The Police Department maintains a list of functional needs individuals who reside in the community. This is deferred to this plan to continue to build and maintain a functional needs list by using social media platforms, the website or sign-up tables at town events. Action item #15
Burning Index	New Hampshire Forests & Lands (DNCR) has a burning index that measures the risk for wildfires and how likely fires are to start on a given day. It also evaluates the potential damages wildfires can create, the number of people that will be needed to fight it and the type of equipment that might be needed as well.	Townwide	NH Hampshire Forests & Lands (DNCR) & Fire Department	Good	Improvements Needed: The Fire Department receives the regular notification of the burning index via email from NH Forests & Lands. This notification is made daily during the fire danger season. This is deferred to consider purchasing Fire Danger sign(s) and establishing the appropriate locations and persons to monitor the sign. Action Item #25

Chapter 7: Last Mitigation Plan

A. DATE OF LAST PLAN

Based on the Disaster Mitigation Act (DMA) of 2000, Woodstock has participated in the development of hazard mitigation plans in the past. The most recent update was formally approved in 2014. This plan, the Woodstock Hazard Mitigation Plan Update 2020, is an update to the 2014 plan.

Below are the action items that were identified in the 2014 plan. The team identified the current status of each strategy based on three sets of questions:

COMPLETED

- Has the strategy been completed?
- If so, what was done?

Strategies “deferred” from the prior plan, were added to **Table 9.1, Mitigation Action Plan** as new strategies and were reprioritized to meet the current needs of the town.

DELETED

- Should the strategy be deleted?
- Is the strategy mitigation or preparedness?
- Is the strategy useful to the town under the current circumstances?

DEFERRED

- Should the strategy be deferred for consideration in this plan?
- If the strategy was not completed, should this strategy be reconsidered and included as a new action item for this plan?

In *Table 7.1: Accomplishments since the Last Plan*, the team was able to assess what had been accomplished and to determine what additional work may be needed. Items in **red font** were extracted word-for-word from the 2014 Hazard Mitigation Plan. Two additional columns that are not shown here – *Funding or Support* and *Time Frame* – can be found in the 2014 Hazard Mitigation Plan.

TABLE 7.1: ACCOMPLISHMENTS SINCE THE LAST PLAN

Rank	New Mitigation Project	Responsibility or Oversight	Completed, Deleted or Deferred
0-1	Action Item #10: Upon completion of the School Emergency Response Plan, hold trainings for school employees and emergency responders. (Table 6.1)	EMD & School Board	Completed & Deferred: The Lin-wood School has completed the school's Emergency Operations Plan according to the annual requirements of the state. The School's plan is current and will be updated in the future, according to the state's requirements. Drills and exercises are done periodically and include the participation of the town's emergency responders. Although this is preparedness, this is deferred to continue to work with the school on future plans, training and exercises. Action Item #16 (Also in Table 6.1)

Rank	New Mitigation Project	Responsibility or Oversight	Completed, Deleted or Deferred
0-2	Action Item #13: Replace two damaged culverts on Reservoir Road that have collapsed as a result of flood waters from Tropical Storm Irene to improve stormwater drainage system capacity. (F13) (Table 6.1)	Road Agent	Completed & Deleted: Two damaged culverts on Reservoir Road that had collapsed during Tropical Storm Irene have been upgraded. The town received FEMA funding after Tropical Storm Irene. Deleted as this project is complete. (Also in Table 6.1)
1-1	Action Item #14: Research and obtain the necessary repeater(s) to eliminate "dead" spots in the town's communication system. (Table 6.1)	EMD	Completed & Deferred: This action item from the prior plan was not done due to oversight and funding. This is deferred to this plan to again research and obtain repeaters to help eliminate "dead" spots in the town's communication system. A new cell tower is planned in Woodstock on Harley View Road; space will be provided for emergency communication. Action Item #26 (Also in Table 6.1)
1-2	Action Item #18: Continue to provide Hazmat Training for Emergency Personnel educate & train fire, emergency personnel, fire, and police units for better response. (Table 7.1)	Police & Fire Chiefs	Completed & Deferred: Although Woodstock does not have a HazMat Team, Firefighters are trained in the basic response to a HazMat incident and are adept at maintaining perimeters until specialized teams arrive. The Woodstock EMD or the Fire Chief would most likely call dispatch, who would then contact the state to request an available HazMat Response Team. Although this is preparedness, this is deferred to this plan to continue HazMat training for the members of the Woodstock Fire Department. The nearest HazMat trailer is located in Plymouth. Action Item #8 (Also in Table 6.1)
1-3	Action Item #24: Develop a more formal maintenance program and appropriate recording keeping for future use and conduct maintenance of all fire hydrants to reduce risk. (WF7) (Table 7.1)	Fire Chief/Highway	Completed & Deleted: Pennichuck Water Works, Inc. has been hired by the town to provide maintenance of all hydrants in the community. Deleted as Pennichuck maintains an inventory and a maintenance plan to ensure the availability of water resources for the Woodstock Fire Department.
1-4	Action Item #12: The Woodstock Emergency Operations Plan was developed in 1987; update the Emergency Operations Plan to increase the town's ability to respond to disasters and to mitigate future or continued occurrences; incorporate this plan as an annex to the Emergency Operations Plan. (Tables 6.1 & 7.1)	EMD	Completed & Deferred: The Woodstock Emergency Operations Plan (EOP) was last updated in 2014 and has passed the recommended 5-year expiration. An updated EOP will include an EOC Call Alert List as well as a detailed Resource Inventory List and Player Packets and adhere to the state's 15-ESF template. This is deferred to this plan to update the EOP as soon as possible. Action Item #19 (Also in Table 6.1)
1-5	Action Item #3: Obtain and have available "Firewise" brochures to educate homeowners on methods to reduce fire risk around their homes (WF10) ; provide "Firewise" brochures to those residents seeking burn permits; advise residents of the importance of maintaining defensible space, the safe disposal of yard and household water and the removal of deal or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches and yards. (WF12) (Table 7.1)	EMD & Fire Chief	Completed & Deferred: Although the town has provided Firewise [®] brochures in the past, the supply has diminished. The team felt that it is important to have Firewise [®] brochures available to promote the development of defensible space around Town and privately owned structures. Burn permits are issued both online and in person. This is deferred to provide Firewise [®] brochures to those persons seeking burn permits in person. Continue to educate campground owners and other business owners about the need for defensible and safe fire practices. Action Item #13

Rank	New Mitigation Project	Responsibility or Oversight	Completed, Deleted or Deferred
1-6	<p>Action Item #1: Establish an interactive webpage for educating the public on hazard mitigation and preparedness measures (MU14) by adding a page to the town's recently enhanced website that will include such information as emergency contacts, shelter locations, evacuation routes (SW7, WF11 & T3), methods of emergency alerting, 911 compliance, water saving techniques (D9), earthquake risk and mitigation activities that can be taken in residents' homes (EQ7), steps homeowners can take to protect themselves and their properties when extreme temperatures occur (ET1 & ET4), safety measures that can be taken during hail (HA3) and lightning storms (L2), mitigation techniques for property protection and links to available sources; educate homeowners regarding the risks of building in hazard zones and encourage homeowners to install carbon monoxide monitors and alarms (WW5). (Table 7.1)</p>	EMD	<p>Completed & Deferred: The town has created an Emergency Services link on the town's website. In addition to the information already provided, this is a great way to provide outreach to residents on not only emergency preparedness but also mitigation techniques property owners can use to reduce or eliminate the impact of natural hazards. This is deferred to this plan to provide robust information and links to the Emergency Services webpage to educate the public on general and seasonal mitigation techniques, including the use of carbon monoxide detectors and the proper use of gas grills. Action Item #14</p>
2-1	<p>Action Item #6: Review the E-911 system to determine compliance with regards to signage and the need for a town-wide ordinance; promote community compliance by providing more public outreach to the community. (Table 6.1)</p>	EMD	<p>Completed & Deleted: The town is about 98% compliant with E-911 signage. The town has been very successful in reaching this level of compliance and felt that this strategy from the prior plan should be deleted. Emergency responders, however, will continue to promote good signage through public outreach as needed. (Also in Table 6.1)</p>
2-2	<p>Action Item #8: Educate residents who live on private roads of the importance of maintaining their roads for first responders by adding information to the town's website. (WF8)</p>	EMD & Administrative Assistant	<p>Completed & Deferred: The town has taken efforts to remind residents of the importance of maintaining private roads for emergency response. This is deferred to continue to provide reminders to citizens who live on private roads to continue to maintain these roads to protect emergency service capabilities. Action Item #6</p>
2-3	<p>Action Item #26: Mail or distribute "courtesy notifications" to resources that are mentioned in this plan as determined by the EMD.</p>	EMD	<p>Deleted: It was determined after the last hazard mitigation plan that courtesy notifications were not necessary. Because of this and because this is preparedness, this strategy is deleted.</p>
2-4	<p>Action Item #17: Identify personnel and conduct training for shelter operations, perhaps through American Red Cross. (Table 7.1)</p>	EMD	<p>Deleted: The identification of personal for shelter operations is done through the Emergency Operations Planning process. This is preparedness, not mitigation; therefore, it is deleted.</p>

Rank	New Mitigation Project	Responsibility or Oversight	Completed, Deleted or Deferred
2-5	<p>Action Item #11: During the next update of the Master Plan, review and incorporate concepts from this Hazard Mitigation Plan and from the Rural Fire Water Resource Plan. (Table 6.1)</p>	<p>Planning Board</p>	<p>Completed & Deferred: The Planning Board has used the prior Hazard Mitigation Plan and the Rural Fire Water Resource Plan in the past when reviewing or discussing changes in the Master Plan. The Woodstock Master Plan was last updated in 2014 and will be ready for a recommended complete in 2024, which is within the scope of this plan. This is deferred to update the Master Plan according to the state's 10-year recommendation and to consider including a Natural Hazards Section and mitigation items from this plan in any future updates. Action Item #5 (Also in Table 6.1)</p>
2-6	<p>Action Item #7: Provide public outreach to encourage residents to contact Grafton County Sheriff's Department (manages Code Red) to add cell numbers, unlisted numbers, to verify information and to improve household disaster preparedness (MU15); use the town's website and appropriate links to accomplish. (Tables 6.1 & 7.1)</p>	<p>EMD</p>	<p>Completed & Deferred: CodeRED is an excellent warning system, but it only stores phone numbers that are listed in the phone book. The town provides information to residents on CodeRED through the town's website. This is deferred to continue to provide public outreach to encourage all residents to contact CodeRED to add cell numbers, emails, unlisted numbers, and to verify the information. Use the website, a possible brochure at the Town Office, social media platforms or a sign up at Town Meeting. Action Item #12 (Also in Table 6.1)</p>
2-7	<p>Action Item #20: Research cost and considering mapping woods roads and trails to assess vulnerability to wildfire and to improve firefighting capabilities. (WF1) (Table 7.1)</p>	<p>EMD</p>	<p>Deleted: It was determined after the last hazard mitigation plan that it would not be cost-beneficial to contract for the mapping of woods roads. Many of the woods roads in Woodstock are already mapped and shown on snowmobile and hiking trail maps. Because of this and because this is preparedness, this strategy is deleted.</p>
2-8	<p>Action Item #2: Advise the public about the local flood hazard, flood insurance and flood protection measures (F10) by obtaining and keeping on hand a supply of NFIP brochures to have available in the Town Offices; give NFIP materials to homeowners and builders when proposing new development or substantial improvements; encourage property owners to purchase flood insurance (F22), whether or not they are in the flood zone and provide appropriate links to the NFIP and Ready.gov on the town's website.</p>	<p>EMD & Administrative Assistant</p>	<p>Completed & Deferred: Although the town had obtained NFIP brochures in the past, the supply has dwindled. This is deferred to this plan to advise the public about the local flood hazard, flood insurance and flood protection measures by obtaining and keeping on hand a supply of NFIP brochures to have available in the Town Offices. Give NFIP materials to homeowners and builders when proposing new development or substantial improvements and notify property owners that flood insurance is available whether or not they are in the flood zone. Educate homeowners regarding the risks of building in the flood zone and measures that can be taken to reduce the chance of flooding, such as securing debris, propane tanks, yard items or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters. Work with residents to ensure they comply with the town's Floodplain Ordinance. Provide appropriate links to the NFIP and Ready.gov on the Emergency Management webpage. Action Item #10 (Also in Table 6.1)</p>

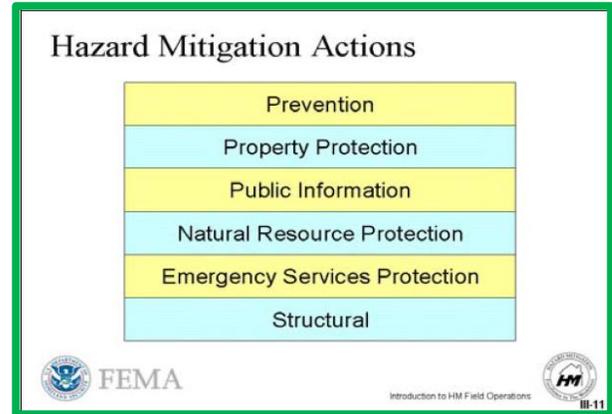
Rank	New Mitigation Project	Responsibility or Oversight	Completed, Deleted or Deferred
2-9	Action Item #16: Encourage local businesses and residents to install generators through numerous methods (Town Report, Letter, Visits) to improve household disaster preparedness. (MU15) (Table 7.1)	EMD	Deleted: This strategy from the prior plan was not completed. It is now deleted as it is emergency preparedness.
2-10	Action Item #4: Add information to the town's Emergency Management webpage about the risks of carbon monoxide and gas grills. (MU14 & WF12) (Table 7.1)	EMD & Administrative Assistant	Completed & Deleted: This was not done due to oversight; however, it is recommended that the risks of carbon monoxide and gas grills be included on the town's website along with other mitigation activities.
2-11	Action Item #5: Through Public Outreach and the town's website, educate homeowners regarding the risks of building in flood zone and measures that can be taken to reduce the chance of flooding such as educating the public about securing debris, propane tanks, yard items or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washing by floodwaters; add a link to ready.gov. (F23)	EMD & Administrative Assistant	Completed & Deleted: To reduce duplication, public outreach for flood mitigation is provided in Action Item #10
3-1	Action Item #23: Obtain additional shelter supplies. (Table 7.1)	EMD	Deleted: It was determined after the last hazard mitigation plan that shelter supplies would be available to the town in an emergency from Central NH Regional Public Health Network, the American Red Cross and Homeland Security. Because of this and because this is preparedness, this strategy is deleted.
3-2	Action Item #22: Work with the Linwood School Board to obtain a generator for the protection of infrastructure and critical facilities should the school be used as an emergency shelter. (MU13) (Table 7.1)	EMD & School Board	Completed & Deferred: This was not done due to cost but still needs to be done. Deferred to consider options and further discuss the possibility of installing a generator at the Lin-Wood School. Action Item #20
3-3	Action Item #9: NIMS & ICS Training for Town Officials in order to have better trained individuals handling disaster events so that the effects of the event can be mitigated. (ICS 100 & 200; NIMS 700). (Tables 6.1 & 7.1)	EMD	Completed & Deferred: Most first responders have done NIMS & ICS training. Although this is preparedness, this is deferred to this plan to continue to provide NIMS (IS-700) & ICS (ICS 100 & ICS 200) training to new first responders and new Town officials as they become elected or appointed. Action Item #7 (Also in Table 6.1)
3-4	Action Item #21: Obtain four additional small generators to be used for both Town facilities and individual homes as the need arises; protect infrastructure and critical facilities. (MU13) (Tables 6.1 & 7.1)	EMD	Partially Completed & Deleted: This strategy from the prior plan has been partially completed having purchased three generators. It was determined that a fourth portable generator is not needed; therefore, this strategy is deleted. (Also in Table 6.1)

Rank	New Mitigation Project	Responsibility or Oversight	Completed, Deleted or Deferred
3-5	Action Item #15: Complete curbing project on Main Street to improve the flow of stormwater and stormwater management in general. (F13) (Table 7.1)	Highway Department	Partially Completed & Deferred: Main Street curbing project has been completed. A portion of the southern part of town is currently on schedule to be completed. Action Item #29
3-6	Action Item #19: During the next update of the Subdivision Regulations, review and incorporate concepts from this Hazard Mitigation Plan and from the Rural Fire Water Resource Plan. (WF2) (Table 7.1)	Planning Board, Fire Chief & Highway Department	Completed & Deferred: The Planning Board has used the prior Hazard Mitigation Plan and the Rural Fire Water Resource Plan in the past when reviewing or discussing changes in the Subdivision Regulations. The Subdivision Regulations were last updated in 2011. This is deferred to update the Subdivision Regulations and to consider mitigation items from this plan in any future updates. Action Item #24 (Also in Table 6.1)
3-7	Action Item #25: Investigate the associated costs to build security fences around wellhead and the water tank in order to infrastructure and critical facilities. (MU13)	Highway Department	Completed & Deleted: This strategy was not done due to oversight. This is deleted as the wells are located in a remote location, and the protection that is already there is sufficient.

Chapter 8: New Mitigation Strategies & STAPLEE

A. MITIGATION STRATEGIES BY TYPE

The following list of mitigation categories and comprehensive possible strategy ideas was compiled from several sources, including the USFS, FEMA, other planners and past hazard mitigation plans. This list was used during a brainstorming session to discuss what issues there may be in town. Team involvement and the brainstorming sessions proved helpful in bringing new ideas, better relationships and more in-depth knowledge of the community.



Prevention

- Forest fire fuel reduction programs
- Special management regulations
- Fire Protection Codes NFPA 1
- Firewise® landscaping
- Culvert and hydrant maintenance
- Planning and zoning regulations
- Building Codes
- Density controls
- Driveway standards
- Slope development regulations
- Master Plan
- Capital Improvement Plan
- Rural Fire Water Resource Plan
- NFIP compliance

Public Education & Awareness

- Hazard information centers
- Public education and outreach programs
- Emergency website creation
- Firewise® training
- National Flood Insurance Program (NFIP) awareness
- Public hazard notification
- Defensible space brochures

Emergency Service Protection

- Critical facilities protection
- Critical infrastructure protection
- Emergency training for town officials
- Ongoing training for first responders

Property Protection

- Current use or other conservation measures
- Transfer of development rights
- Firewise® landscaping
- Water drafting facilities
- High-risk notification for homeowners
- Structure elevation
- Real estate disclosures
- Floodproofing
- Building codes
- Development regulations

Natural Resource Protection

- Best management practices within the forest
- Forest and vegetation management
- Forestry and landscape management
- Wetlands development regulations
- Watershed management
- Erosion control
- Soil stabilization
- Open space preservation initiatives

Structural Projects

- Structure acquisition and demolition
- Structure acquisition and relocation
- Bridge replacement
- Dam removal
- Culvert up-size and/or realignment

B. POTENTIAL MITIGATION STRATEGIES BY HAZARD

To further promote the concept of mitigation, the team was provided with a handout that was developed by Mapping and Planning Solutions and used to determine what additional mitigation action items might be appropriate for the town. The mitigation action items from that handout are listed below and on the following page. Each item from this comprehensive list of possible mitigation action items was considered by the planning team to determine if any of these action items could be put in place for Woodstock with particular emphasis on new and existing buildings and infrastructure.

Strategies that may apply to more than one hazard	Type of Project
• <i>Community Outreach and Education</i>	<i>Public Awareness</i>
• <i>Changes to Zoning Regulations</i>	<i>Prevention</i>
• <i>Changes to Subdivision Regulations</i>	<i>Prevention</i>
• <i>Steep Slopes Ordinance</i>	<i>Prevention</i>
• <i>Density Controls</i>	<i>Prevention</i>
• <i>Driveway Standards</i>	<i>Prevention</i>
• <i>Emergency Website Creation</i>	<i>Public Awareness</i>
• <i>Critical Infrastructure & Key Resources</i>	<i>Emergency Service Protection</i>
• <i>Emergency Training for Town Officials</i>	<i>Emergency Service Protection</i>
• <i>High Risk Notification to Homeowners</i>	<i>Property Protection</i>
• <i>Master Plan Update or Development</i>	<i>Prevention</i>
• <i>Capital Improvement Plan</i>	<i>Prevention</i>
Flood Mitigation Ideas	Type of Project
• <i>Stormwater Management Ordinances</i>	<i>Prevention</i>
• <i>Floodplain Ordinances</i>	<i>Prevention</i>
• <i>Updated Floodplain Mapping</i>	<i>Prevention</i>
• <i>Watershed Management</i>	<i>Natural Resource Protection</i>
• <i>Drainage Easements</i>	<i>Prevention</i>
• <i>Purchase of Easements</i>	<i>Prevention</i>
• <i>Wetland Protection</i>	<i>Natural Resource Protection</i>
• <i>Structural Flood Control Measures</i>	<i>Prevention</i>
• <i>Bridge Replacement</i>	<i>Structural Project</i>
• <i>Dam Removal</i>	<i>Structural Project</i>
• <i>NFIP Compliance</i>	<i>Prevention</i>
• <i>Acquisition, Demolition & Relocation</i>	<i>Structural Project</i>
• <i>Structure Elevation</i>	<i>Structural Project</i>
• <i>Flood Proofing</i>	<i>Property Protection</i>
• <i>Erosion Control</i>	<i>Natural Resource Protection</i>
• <i>Floodplain/Coastal Zone Management</i>	<i>Prevention</i>
• <i>Building Codes Adoption or Amendments</i>	<i>Prevention</i>
• <i>Culvert & Hydrant Maintenance</i>	<i>Prevention</i>
• <i>Culvert & Drainage Improvements</i>	<i>Structural Protection</i>
• <i>Transfer of Development Rights</i>	<i>Property Protection</i>

Natural Hazard Mitigation Ideas

Type of Project

Landslide

- Slide-Prone Area Ordinance Prevention
- Drainage Control Regulations Prevention
- Grading Ordinances Prevention
- Hillside Development Ordinances Prevention
- Open Space Initiatives Prevention
- Acquisition, Demolition & Relocation Structural Project
- Vegetation Placement and Management Natural Resource Protection
- Soil Stabilization Natural Resource Protection

Thunderstorms & Lightning

- Building Construction Property Protection

Tornado & Severe Wind

- Construction Standards and Techniques Property Protection
- Safe Rooms Prevention
- Manufactured Home Tie Downs Property Protection
- Building Codes Property Protection

Wildfire

- Building Codes Property Protection
- Defensible Space Prevention
- Forest Fire Fuel Reduction Prevention
- Burning Restriction Property Protection
- Water Resource Plan Prevention
- Firewise® Training & Brochures Public Awareness
- Woods Roads Mapping Prevention

Extreme Temperatures

- Warming & Cooling Stations Prevention

Winter Weather Snowstorms

- Snow Load Design Standards Property Protection

Subsidence

- Open Space Natural Resource Protection
- Acquisition, Demolition & Relocation Structural Project

Earthquake

- Construction Standards and Techniques Property Protection
- Building Codes Property Protection
- Bridge Strengthening Structural Project
- Infrastructure Hardening Structural Project

Drought

- Water Use Ordinances Prevention

C. STAPLEE METHODOLOGY

Table 8.1, *Potential Mitigation Items & the STAPLEE*, reflects the newly identified potential hazard mitigation action items as well as the results of the STAPLEE evaluation, as explained below. Although some areas are identified as All Hazards, many of these would apply indirectly to wildfire response and capabilities. Many of these potential mitigation action items overlap.

The goal of each proposed mitigation action item is “to reduce or eliminate the long-term risk to human life and property from hazards”. To determine the effectiveness of each mitigation action item in accomplishing this goal, a set of criteria that was developed by FEMA, the STAPLEE method, was applied to each proposed action item.

The STAPLEE method analyzes the **S**ocial, **T**echnical, **A**ministrative, **P**olitical, **L**egal, **E**conomic and **E**nvironmental aspects of a project. It is commonly used by public administration officials and planners for making planning decisions. The following questions were asked about the proposed mitigation action items discussed in Table 8.1.

Social: Is the proposed action item socially acceptable to the community? Is there an equity issue involved that would result in one segment of the community being treated unfairly?

Technical: Will the proposed action item work? Will it create more problems than it solves?

Administrative:..... Can the community implement the action item? Is there someone to coordinate and lead the effort?

Political: Is the action item politically acceptable? Is there public support both to implement and to maintain the project?

Legal:..... Is the community authorized to implement the proposed action item? Is there a clear legal basis or precedent for this activity?

Economic:..... What are the costs and benefits of this action item? Does the cost seem reasonable for the size of the problem and the likely benefits?

Environmental:..... How will the action item impact the environment? Will it need environmental regulatory approvals?

Each proposed mitigation action item was then evaluated and assigned a score based on the above criteria. Each of the STAPLEE categories was discussed and was awarded one of the following scores:

1 - Poor 2 - Average 3 - Good

An evaluation chart with total scores for each new action item is shown in Table 8.1.

The “Type” of Action Item was also considered (see section A of this chapter for reference):

- Prevention
- Public Education & Awareness
- Emergency Service Protection
- Property Protection
- Natural Resource Protection
- Structural Projects

D. TEAM’S UNDERSTANDING OF HAZARD MITIGATION ACTION ITEMS

The team determined that any strategy designed to reduce personal injury or damage to property that could be done before an actual disaster would be listed as a potential mitigation action item. This decision was made even though not all projects listed in Table 8.1 and Table 9.1, *The Mitigation Action Plan*, are fundable under FEMA pre-mitigation guidelines. The team determined that this plan was, in large part, a management document designed to assist the Select Board and other town officials in all aspects of managing and tracking potential emergency planning action items. For instance, the team was aware that some of these action items are more appropriately identified as preparedness or readiness issues. As there are no other established planning mechanisms that recognize some of these issues, the team did not want to “lose” any of the ideas discussed during these planning sessions and thought this method was the best way to achieve that objective.

The town understands that the action items for a town of 200 people are not the same as the action items for a town of 30,000 people. Also, the action items for a town in the middle of predominantly hardwood forests are not the same as the action items for a town on the Jersey Shore. Therefore the Town of Woodstock has accepted the “Mitigation Action Items” in Tables 8.1 and 9.1 as the complete list of “Mitigation Action Items” for this town and only this town. The Town of Woodstock hereby indicates that having considered a comprehensive list of other possible mitigation action items (see sections A & B of this chapter) for this plan, there are no additional “Mitigation Action Items” to add at this time.

Potential mitigation action items in Table 8.1 are listed in numerical order and indicate if they were derived from prior tables in this plan, i.e., (Table 7.1).

Items in green such as (MU14) represent mitigation action items taken from Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013; see Appendix F: *Potential Mitigation Ideas*, for more information.

TABLE 8.1: POTENTIAL MITIGATION ACTION ITEMS & THE STAPLEE

Action Items are listed in numerical order.

Proposed Mitigation Action Items	Affected Location Type of Activity	S	T	A	P	L	E	E	TTL
		3	3	3	3	3	3	3	21
<p>Action Item #1: Continue to maintain culverts and ditches in the community and develop and maintain a written stormwater maintenance plan to ensure more efficient stormwater management. Include the location, date of installation, GPS coordinates, material, type, size, age and expected replacement date of all culverts, catch basins and drainage ditches in the community. (F5) (Table 6.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Emergency Service Protection <input type="checkbox"/>Property Protection <input type="checkbox"/>Natural Resource Protection</p>	<p>No apparent difficulty with this action item</p>							

Proposed Mitigation Action Items	Affected Location Type of Activity	S	T	A	P	L	E	E	TTL
Action Item #2: In addition to work that is done by and with local utility companies, continue to monitor and maintain brush cutting, drainage system maintenance and tree removal as part of a tree maintenance program and continue to create defensible space around power lines, oil and gas lines and other infrastructure; continue to work to reduce wildfire risk by clearing dead vegetation, cutting high grass and other fuel loads in the community. (SW4, WF7, WF9 & F14) (Table 6.1)	<u>Location</u> Townwide <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection <input type="checkbox"/> Property Protection <input type="checkbox"/> Natural Resource Protection	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							
Action Item #3: Routinely inspect the functionality of fire hydrants and continue the maintenance and repair of all hydrants and other water resources in Woodstock. Consider other areas of the community that have limited water resources and address these issues by installing new hydrants, fire ponds or cisterns as needed. (WF8)	<u>Location</u> Townwide <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection <input type="checkbox"/> Property Protection <input type="checkbox"/> Natural Resource Protection	3	3	3	2	3	3	3	20
		<i>Political: Some may feel that this should be handled by the town</i>							
Action Item #4: Provide public outreach to the citizens of Woodstock regarding the availability of the Town Office as a "cooling or warming center" during times of extended high temperatures and severe winter weather; use available social media platforms and the town's website. (ET3 & WW6)	<u>Location</u> Town Office <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Public Education & Awareness	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							
Action Item #5: Update the Master Plan according to the state's 10-year recommendation and consider including a Natural Hazards Section and mitigation items from this plan, or the Rural Fire Water Resource Plan, in any future reviews or updates. (MU6) (Tables 6.1 & 7.1)	<u>Location</u> Townwide <u>Type of Activity</u> <input type="checkbox"/> Prevention	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							
Action Item #6: Provide public education to those residents that live on private roads about the importance of maintaining these roads for emergency responders by adding information to the town's website via an Emergency Webpage or by using available social media. (MU16) (Table 7.1)	<u>Location</u> Townwide <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Public Education & Awareness <input type="checkbox"/> Emergency Service Protection <input type="checkbox"/> Property Protection	3	3	2	3	3	2	3	19
		<i>Administrative: Finding time and staff to manage the webpage may be difficult Economical: There may be related costs</i>							
Action Item #7: The Emergency Management Director (EMD) to encourage all town officials who may be required to respond to an emergency, and any new emergency responders to take NIMS 700 (S-700) & ICS (ISC100 & ISC200); additionally, the EMD and other vital emergency responders to learn about and become adept with WEB-EOC. (Tables 6.1 & 7.1)	<u>Location</u> Townwide <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							
Action Item #8: Continue HazMat training for the members of the Woodstock Fire Department. (Tables 6.1 & 7.1)	<u>Location</u> Townwide <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							

Proposed Mitigation Action Items	Affected Location Type of Activity	S	T	A	P	L	E	E	TTL
<p>Action Item #9: Provide training of all fire responders on the many aspects of emergency response throughout the li. Training is done through the Twin State Fire Mutual Aid, the Woodstock Fire Department and the NH Fire Academy. This is deferred for continued training through 2024. (Table 6.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Emergency Service Protection <input type="checkbox"/>Property Protection <input type="checkbox"/>Natural Resource Protection</p>	3	3	3	3	3	3	3	21
<p><i>No apparent difficulty with this action item</i></p>									
<p>Action Item #10: Advise the public about the local flood hazard, flood insurance and flood protection measures (F10) by obtaining and keeping on hand a supply of NFIP brochures to have available in the Town Offices; give NFIP materials to homeowners and builders when proposing new development or substantial improvements; encourage property owners to purchase flood insurance (F22), whether or not they are in the flood zone and provide appropriate links to the NFIP and Ready.gov on the Emergency webpage or available Facebook pages; through Public Outreach, educate homeowners regarding the risks of building in the flood zone and measures that can be taken to reduce the chance of flooding, such as securing debris, propane tanks, yard items or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters; add links and info to website and available social media platforms and continue to actively work with residents to ensure they are in compliance with the town's Floodplain Ordinance. (F23) (Tables 6.1 & 7.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Public Education & Awareness <input type="checkbox"/>Property Protection</p>	3	3	2	3	3	2	3	19
<p>Administrative: Finding time and staff to manage the webpage may be difficult Economical: There may be related costs</p>									
<p>Action Item #11: The Woodstock EMD should promote citizen involvement in the regional Central NH CERT and MRC Units that have been established by the Central NH Regional Public Health Network. (MU6) (Table 6.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Public Education & Awareness <input type="checkbox"/>Emergency Service Protection</p>	3	3	3	3	3	3	3	21
<p><i>No apparent difficulty with this action item</i></p>									
<p>Action Item #12: Provide public outreach to encourage all residents to contact CodeRED to add cell numbers, unlisted numbers, emails, and to verify information; use the website, a possible brochure at the Town Office, social media platforms or a sign up at Town Meeting. (MU14) (Tables 6.1 & 7.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Public Education & Awareness</p>	3	3	2	3	3	2	3	19
<p>Administrative: Finding time and staff to manage the webpage may be difficult Economical: There may be related costs</p>									

Proposed Mitigation Action Items	Affected Location Type of Activity	S	T	A	P	L	E	E	TTL
<p>Action Item #13: Post important information on the town's emergency website and notices of red flag burning days. Obtain and have available Firewise® brochures to educate homeowners on methods to reduce fire risk around their homes (WF10) and provide a link to Firewise® on the Emergency page of the town's website. Provide Firewise® brochures to those residents seeking burn permits and advise residents of the importance of maintaining defensible space, the safe disposal of yard and household waste, and the removal of dead or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches and yards. Educate campground owners and other business owners about the need for defensible and safe fire practices. (WF12) (Table 7.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Public Education & Awareness <input type="checkbox"/>Property Protection <input type="checkbox"/>Natural Resource Protection</p>	3	3	2	3	3	2	3	19
<p>Action Item #14: Provide robust information on the town's Emergency Services link (town's website) and on available social media platforms for educating the public on hazard mitigation and preparedness measures (MU14). Add information such as emergency contacts, shelter locations, evacuation routes (SW7, WF11 & T3), methods of emergency alerting, 911 compliance, water-saving techniques (D9), earthquake risk and mitigation activities that can be taken in residents' homes (EQ7), steps homeowners can take to protect themselves and their properties when extreme temperatures occur (ET1 & ET4), safety measures that can be taken during hailstorms (HA3) and lightning storms (L2), mitigation techniques for property protection and links to available sources. Encourage homeowners to install carbon monoxide monitors and alarms and to follow best practices when outdoor grilling. Provide appropriate health alert notices to the public to guard against infectious disease. (WW5) (Table 7.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Public Education & Awareness</p>	3	3	2	3	3	2	3	19
<p>Action Item #15: Update the current functional needs database that has already been established. Continue to build and maintain this functional needs list by using social media platforms, the website or sign-up tables at town events. (ET3 & WW6) (Table 6.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Public Education & Awareness</p>	3	3	3	2	3	3	3	20
<p>Action Item #16: Work with the Lin-Wood School (SAU 68) to update the School's EOP on an annual basis and to participate in training or drills with school personnel to ensure the emergency response. (MU6) (Tables 6.1 & 7.1)</p>	<p><u>Location</u> Lin-Wood School (Lincoln)</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Emergency Service Protection</p>	3	3	3	3	3	3	3	21

Proposed Mitigation Action Items	Affected Location Type of Activity	S	T	A	P	L	E	E	TTL
Action Item #17: Provide an annual review of the Woodstock Hazard Mitigation Plan Update 2020, including a review of the status of "Action Items" listed in this plan to encourage completion; get approval from the local elected body on an annual basis and complete a complete update of this plan in 2024. (MU11) (Table 6.1)	<u>Location</u> Townwide <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Public Education & Awareness	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							
Action Item #18: Improve the flow of stormwater on Clark Farm Road by upgrading the underperforming and aging metal culvert with a larger plastic culvert. (F13)	<u>Location</u> Clark Farm Road <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection <input type="checkbox"/> Structural Project	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							
Action Item #19: Update the Woodstock Emergency Operations Plan to coincide with the state 15-ESF format; include an analysis of the impact of natural hazards on Critical Infrastructure & Key Resources that may be needed during an emergency. As part of the EOP, include an EOC Call Alert List as well as a detailed Resource Inventory List and Player Packets. (MU6) (Tables 6.1 & 7.1)	<u>Location</u> Townwide <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							
Action Item #20: Working with SAU 68, the Lin-Wood School Board and the Town of Lincoln obtain and install a generator at the Lin-Wood School so that this facility can be used as the Primary Shelter for both Lincoln and Woodstock during a disaster or hazardous event. (MU13) (Table 7.1)	<u>Location</u> Lin-Wood School (Lincoln) <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection <input type="checkbox"/> Structural Project	3	3	3	2	2	2	3	18
		Political: Some people in both Lincoln and Woodstock may not agree Legal: Woodstock does not have legal authority at the Linwood School and would need cooperation from SAU68 Economical: Budget constraints							
Action Item #21: Improve the flow of stormwater to prevent flooding on Thornton Gore Road by improving the 18" metal culvert by adding a plastic "sleeve" that will help mitigate the potential for flooding and road erosion. By installing a "sleeve" at this site, the town is minimizing the impact of the project on its citizens. (F13)	<u>Location</u> Thornton Gore Road <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection <input type="checkbox"/> Structural Project	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							
Action Item #22: Improve the flow of stormwater to prevent flooding on Gray Squirrel Road by improving the 12" metal underperforming culvert with a 15" plastic culvert. (F13)	<u>Location</u> Gray Squirrel Road <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection <input type="checkbox"/> Structural Project	3	3	3	3	3	3	3	21
		<i>No apparent difficulty with this action item</i>							
Action Item #23: The Select Board and Planning Board, in coordination with the Building Inspector, will review the building permit and building process for improvements to reduce the risks to structures that can result from natural hazards and to educate the public on the BOCA codes. (EQ1, SW1, WW1, MU4) (Table 6.1)	<u>Location</u> Townwide <u>Type of Activity</u> <input type="checkbox"/> Prevention <input type="checkbox"/> Emergency Service Protection <input type="checkbox"/> Property Protection <input type="checkbox"/> Natural Resource Protection	3	3	3	2	3	3	3	20
		Political: Some contractors may have opinions on the building permit and the building process							

Proposed Mitigation Action Items	Affected Location Type of Activity	S	T	A	P	L	E	E	TTL
<p>Action Item #24: Review and update the Subdivision Regulations to consider changes that could potentially reduce the impact of future hazards. Consider new regulations regarding water resource availability for firefighting, stormwater flow, the steepness of driveways and building on steep slopes in new subdivisions. Continue to consider mitigation items from this plan and the Rural Fire Water Resource Plan in any future updates. (MU6) (Tables 6.1 & 7.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention</p>	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
<p>Action Item #25: Research options and consider purchasing a fire danger sign or signs and establish appropriate locations to warn residents and visitors of the daily fire danger. Also, determine who will be responsible for monitoring and updating the sign. (WF11) (Table 6.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Emergency Service Protection <input type="checkbox"/>Property Protection <input type="checkbox"/>Natural Resource Protection</p>	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							
<p>Action Item #26: Research and obtain repeaters to help eliminate "dead" spots in the town's emergency communication system. (Tables 6.1 & 7.1)</p>	<p><u>Location</u> Townwide</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Emergency Service Protection</p>	3	3	3	3	3	2	3	20
		Economical: Budget Constraints							
<p>Action Item #27: To protect this important critical facility, obtain funding and engineering studies to move the Woodstock DPW Garage from its current location on the banks of the Pemigewasset River to another location (already identified) that is free from inland flooding, erosion and other natural hazards. (MU13)</p>	<p><u>Location</u> DPW Garage</p> <p><u>Type of Activity</u> <input type="checkbox"/>Emergency Service Protection</p>	3	3	3	2	3	1	2	17
		<p>Political: Some may not want the town to spend money on this</p> <p>Economical: Budget constraints</p> <p>Environmental: May need DES approval</p>							
<p>Action Item #28: Obtain funding and replace the aging water line in lower Woodstock along Route 3 to prevent future road problems such as sinkholes, poor water quality or lack of water, road erosion and potential flooding. (MU13)</p>	<p><u>Location</u> Lower Woodstock Water Line</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Structural Project</p>	3	3	2	2	3	1	2	16
		<p>Administrative: The town will need to hire an outside contractor</p> <p>Political: Some may not want the town to spend money on this.</p> <p>Economical: Budget constraints</p> <p>Environmental: May need state & DES approvals</p>							
<p>Action Item #29: Complete the southern part of the Main Street curbing project to manage the flow of stormwater better. (F13) (Table 7.1)</p>	<p><u>Location</u> Main Street (southern end)</p> <p><u>Type of Activity</u> <input type="checkbox"/>Prevention <input type="checkbox"/>Structural Project</p>	3	3	3	3	3	3	3	21
		No apparent difficulty with this action item							

Chapter 9: Implementation Schedule for Prioritized Action Items

A. PRIORITY METHODOLOGY

After reviewing the finalized STAPLEE numerical ratings, the team prepared to develop *Table 9.1, The Mitigation Action Plan*. To do this, team members created four categories into which they would place the potential mitigation action items.

CATEGORY 0

Category 0 includes those items which are being done and will continue to be done in the future.

CATEGORY 1

Category 1 includes those items under the direct control of town officials within the financial capability of the town using only town funding, those already being done or planned and those that could generally be completed within one year.

CATEGORY 2

Category 2 includes those items that the town does not have sole authority to act upon, those for which funding might be beyond the town's capability and those that would generally take between 13-36 months to complete.

CATEGORY 3

Category 3 includes those items that would take a significant funding effort, those that the town has little control over the final decision and those that would take more than 37 months to complete.

Each potential mitigation action item was placed in one of these four categories. Then those action items were prioritized within each category according to cost-benefit, time frame and capability. Actual cost estimates were unavailable during the planning process. However, using the STAPLEE process along with the methodology detailed above and a Low-High estimate (see following page), the team was able to come up with a consensus on cost-benefit for each proposed action item.

The team also considered the following criteria while ranking and prioritizing each action item:

- *Does the action reduce damage?*
- *Does the action contribute to community objectives?*
- *Does the action meet existing regulations?*
- *Does the action protect historic structures?*
- *Does the action keep in mind future development?*
- *Can the action be implemented quickly?*

The prioritization exercise helped the committee seriously evaluate the new hazard mitigation action items that they had brainstormed throughout the hazard mitigation planning process. While all actions would help improve the town's hazard and wildfire responsiveness capability, funding availability will be a driving factor in determining what and when new mitigation action items are implemented.

B. WHO, WHEN, HOW?

Once this was completed, the team developed an action plan that outlined who is responsible for implementing each action item, as well as when and how the actions will be implemented. The following questions were asked to develop a schedule for the identified mitigation action items.

WHO? Who will lead the implementation efforts? Who will put together funding requests and applications?

WHEN? When will these actions be implemented and in what order?

HOW? How will the community fund these projects? How will the community implement these projects? What resources will be needed to implement these projects?

In addition to the prioritized mitigation action items, *Table 9.1, The Mitigation Action Plan*, includes the responsible party (WHO), how the project will be supported (HOW) and what the time frame is for implementation of the project (WHEN).

Once the plan is approved, the community will begin working on the action items listed in *Table 9.1, The Mitigation Action Plan* (see below and on the following pages). An estimation of completion for each action item is noted in the “Time Frame” column of Table 9.1. Some projects, including most training and education of residents on emergency and evacuation procedures, could be tied into the emergency operations plan and implemented through that planning effort.

TABLE 9.1: THE MITIGATION ACTION PLAN

Table 9.1, The Mitigation Action Plan, located on the next page, includes problem statements that were expressed by the planning team. These action items are listed in order of priority and indicate if they were derived from other tables in this plan.

The estimated cost was determined using the following criteria:

- **Low Cost**..... \$0 to \$1,000 (or staff time only)
- **Medium Cost** \$1,000 to \$10,000
- **High Cost** \$10,000 or more

The time frame was determined using the following criteria:

- **Short Term**..... Ongoing for the life of the plan
- **Short Term**..... Less than 1 year (0-12 months)
- **Medium Term**..... 1-3 years (13-36 months)
- **Long Term:** 4-5 years (37-60 months)

Items in green such as **(MU14)** represent mitigation action items taken from Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013; see *Appendix F: Potential Mitigation Ideas*, for more information.

Mitigation Action Items are listed in order of priority.

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Responsible Department	Funding or Support	Time Frame	Est. Cost
0-1	<p>Problem Statement: Although the Woodstock Public Works Department works to clean and repair drainage basins and culverts, a written stormwater maintenance plan should be developed to ensure continuity of actions and efficient stormwater management.</p> <p>Action Item #1: Continue to maintain culverts and ditches in the community and develop and maintain a written stormwater maintenance plan to ensure more efficient stormwater management. Include the location, date of installation, GPS coordinates, material, type, size, age and expected replacement date of all culverts, catch basins and drainage ditches in the community. (F5) (Table 6.1)</p>	Inland Flooding	Department of Public Works	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-2	<p>Problem Statement: As tree limbs fall in roadways and water systems and as vegetation grows around utilities, there is a need to continue to work to keep this hazard to a minimum.</p> <p>Action Item #2: In addition to work that is done by and with local utility companies, continue to monitor and maintain brush cutting, drainage system maintenance and tree removal as part of a tree maintenance program and continue to create defensible space around power lines, oil and gas lines and other infrastructure; continue to work to reduce wildfire risk by clearing dead vegetation, cutting high grass and other fuel loads in the community. (SW4, WF7, WF9 & F14) (Table 6.1)</p>	Severe Wind, Wildfire, Ice Storms & Flooding	Department of Public Works	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-3	<p>Problem Statement: About 50% of Woodstock's residents rely on public water supply, the municipal water system located in Woodstock includes pressurized and dry hydrants; the Pennichuck Water Company maintains and tests fire hydrants; this maintenance needs to continue.</p> <p>Action Item #3: Routinely inspect the functionality of fire hydrants and maintain and repair all hydrants and other water resources in Woodstock. Consider other areas of the community that have limited water resources and address these issues by installing new hydrants, fire ponds or cisterns as needed. (WF8)</p>	Wildfire	Department of Public Works, Fire Department & Pennichuck Water	Local	Short Term Ongoing (For the life of the Plan)	High Cost (\$10,000 or more; private contractor)
0-4	<p>Problem Statement: Although public outreach has been done to advise the citizens of Woodstock of the possibility of using the Town Office as a cooling shelter in times of extended high temperatures, additional public outreach needs to be done.</p> <p>Action Item #4: Provide public outreach to the citizens of Woodstock regarding the availability of the Town Office as a "cooling or warming center" during times of extended high temperatures and severe winter weather; use available social media platforms and the town's website. (ET3 & WW6)</p>	Extreme Temperatures & Severe Winter Weather	Emergency Management Director & Selectmen's Assistant	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Responsible Department	Funding or Support	Time Frame	Est. Cost
0-5	<p>Problem Statement: <i>The Woodstock Master Plan (2014) will need an update based on the recommended 10-year guidelines in 2024. The current Master Plan does not have a Natural Hazards section.</i></p> <p>Action Item #5: Update the Master Plan according to the state's 10-year recommendation and consider including a natural hazards section, a discussion on climate change and mitigation items from this plan, or the Rural Fire Water Resource Plan, in any future reviews or updates. (MU6) (Tables 6.1 & 7.1)</p>	All Hazards	Planning Board	Local	Short Term Ongoing (For the life of the Plan; annual reviews)	Low Cost (\$0 - \$1,000 or staff time only)
0-6	<p>Problem Statement: <i>The general public may not be aware of the importance of maintaining private roads and driveways to enable access by emergency responders.</i></p> <p>Action Item #6: Provide public education to those residents that live on private roads about the importance of maintaining these roads for emergency responders by adding information to the town's website via an Emergency Webpage or by using available social media. (MU16) (Table 7.1)</p>	All Hazards	Emergency Management Director & Executive Assistant		Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-7	<p>Problem Statement: <i>Although first responders, including firefighters, have received NIMS & ICS training, not all of Woodstock's town officials have.</i></p> <p>Action Item #7: The Emergency Management Director (EMD) to encourage all town officials who may be required to respond to an emergency and any new emergency responders to take NIMS 700 (S-700) & ICS (ISC100 & ISC200). Additionally, the EMD and other vital emergency responders to learn about and become adept with WEB-EOC. (Tables 6.1 & 7.1)</p>	All Hazards	Emergency Management Director	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-8	<p>Problem Statement: <i>Although Woodstock does not have a HazMat Team, firefighters are trained in the basic response to HazMat incidents and are adept at maintaining perimeters until specialized teams arrive. HazMat training needs to continue for the members of the Woodstock Fire Department.</i></p> <p>Action Item #8: Continue HazMat training for the members of the Woodstock Fire Department. (Tables 6.1 & 7.1)</p>	Hazardous Materials & Transportation Accidents	Fire Department	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-9	<p>Problem Statement: <i>All aspects of fire training are done through the Twin State Fire Mutual Aid, the Woodstock Fire Department and the NH Fire Academy. This training needs to continue.</i></p> <p>Action Item #9: Provide training of all fire responders on the many aspects of emergency response throughout the li. Training is done through the Twin State Fire Mutual Aid, the Woodstock Fire Department and the NH Fire Academy. This is deferred for continued training through 2024. (Table 6.1)</p>	Wildfire, Conflagration	Fire Department	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Responsible Department	Funding or Support	Time Frame	Est. Cost
0-10	<p>Problem Statement: Residents and Builders may not be aware of flood regulations & the availability of flood insurance through the NFIP, and they also may not be aware of the risk of building in the floodplain and the steps they can take to reduce flooding.</p> <p>Action Item #10: Advise the public about the local flood hazard, flood insurance and flood protection measures (F10) by obtaining and keeping on hand a supply of NFIP brochures to have available in the Town Offices; give NFIP materials to homeowners and builders when proposing new development or substantial improvements; encourage property owners to purchase flood insurance (F22), whether or not they are in the flood zone and provide appropriate links to the NFIP and Ready.gov on the Emergency webpage or available Facebook pages; through Public Outreach, educate homeowners regarding the risks of building in the flood zone and measures that can be taken to reduce the chance of flooding, such as securing debris, propane tanks, yard items or stored objects that may otherwise be swept away, damaged, or pose a hazard if picked up and washed away by floodwaters; add links and info to website and available social media platforms and continue to actively work with residents to ensure they are in compliance with the town's Floodplain Ordinance. (F23) (Tables 6.1 & 7.1)</p>	Inland Flooding	Emergency Management Director & Executive Assistant	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-11	<p>Problem Statement: The Central NH CERT and MRC Units have been established by the Central NH Regional Public Health Network. The citizens of Woodstock may not be aware of these volunteer teams and their ability to become members.</p> <p>Action Item #11: The Woodstock EMD should promote citizen involvement in the regional Central NH CERT and MRC Units that have been established by the Central NH Regional Public Health Network. (MU6) (Table 6.1)</p>	All Hazards	Emergency Management Director	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-12	<p>Problem Statement: CodeRED is an excellent warning system, but it only stores resident phone numbers that are listed in the phone book; residents may not be aware that they can add cell numbers, emails and unlisted numbers.</p> <p>Action Item #12: Provide public outreach to encourage all residents to contact CodeRED to add cell numbers, unlisted numbers, emails, and to verify information; use the website, a possible brochure at the Town Office, social media platforms or a sign up at Town Meeting. (MU14) (Tables 6.1 & 7.1)</p>	All Hazards	Emergency Management Director & Executive Assistant	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-13	<p>Problem Statement: Although the town does a great job using its Emergency webpage to promote preparedness, residents may not be aware of the steps they can take to reduce the risk of fire at their homes.</p> <p>Action Item #13: Post important information on the town's emergency website and notices of red flag burning days. Obtain and have available Firewise® brochures to educate homeowners on methods to reduce fire risk around their homes (WF10) and provide a link to Firewise® on the Emergency page of the town's website. Provide Firewise® brochures to those residents seeking burn permits and advise residents of the importance of maintaining defensible space, the safe disposal of yard and household waste and the removal of dead or dry leaves, needles, twigs, and combustible materials from roofs, decks, eaves, porches and yards. Educate campground owners and other business owners about the need for defensible and safe fire practices. (WF12) (Table 7.1)</p>	Wildfire & Conflagration	Emergency Management Director, Fire Chief & Executive Assistant	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Responsible Department	Funding or Support	Time Frame	Est. Cost
0-14	<p>Problem Statement: <i>Although the town has made a reasonable effort in providing public education, more can be done to provide not only emergency preparedness but also hazard mitigation techniques that residents can take to protect their homes and properties.</i></p> <p>Action Item #14: Provide robust information on the town's Emergency Services link (town's website) and available social media platforms for educating the public on hazard mitigation and preparedness measures (MU14). Add information such as emergency contacts, shelter locations, evacuation routes (SW7, WF11 & T3), methods of emergency alerting, 911 compliance, water-saving techniques (D9), earthquake risk and mitigation activities that can be taken in residents' homes (EQ7), steps homeowners can take to protect themselves and their properties when extreme temperatures occur (ET1 & ET4), safety measures that can be taken during hailstorms (HA3) and lightning storms (L2), mitigation techniques for property protection and links to available sources. Encourage homeowners to install carbon monoxide monitors and alarms and to follow best practices when outdoor grilling. Provide appropriate health alert notices to the public to guard against infectious disease. (WW5) (Table 7.1)</p>	All Hazards including: Severe Wind, Drought, Earthquake, Extreme Temperatures, Hail, Lightning, Severe Winter Weather, Tornado, Infectious Disease & Wildfire	Emergency Management Director & Executive Assistant	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-15	<p>Problem Statement: <i>The Police Department maintains a list of functional needs individuals who reside in the community; this list should be updated and further maintained.</i></p> <p>Action Item #15: Update the current functional needs database that has already been established. Continue to build and maintain this functional needs list by using social media platforms, the website or sign-up tables at town events. (ET3 & WW6) (Table 6.1)</p>	Extreme Temperatures, Severe Winter Weather & All Hazards	Police Department	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-16	<p>Problem Statement: <i>Although the Lin-Wood School (SAU 68) updates its Emergency Operations Plan annually according to state requirements, this practice, as well as drills with emergency responders, should continue.</i></p> <p>Action Item #16: Work with the Lin-Wood School (SAU 68) to update the School's EOP on an annual basis and to participate in training or drills with school personnel to ensure the emergency response. (MU6) (Tables 6.1 & 7.1)</p>	All Hazards	Emergency Management Director	Local	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)
0-17	<p>Problem Statement: <i>This plan, the Woodstock Hazard Mitigation Plan Update 2020, will require an annual review and a complete update in five years.</i></p> <p>Action Item #17: Provide an annual review of the Woodstock Hazard Mitigation Plan Update 2020, including a review of the status of "Action Items" listed in this plan to encourage completion; get approval from the local elected body on an annual basis and complete a complete update of this plan in 2024. (MU11) (Table 6.1)</p>	All Hazards	Emergency Management Director	Local & Grants	Short Term Ongoing (For the life of the Plan)	Low Cost (\$0 - \$1,000 or staff time only)

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Responsible Department	Funding or Support	Time Frame	Est. Cost
1-1	<p>Problem Statement: <i>The culvert on Clark Farm Road is not large enough to handle the flow of stormwater, and because of its aging condition, it causes stormwater to flood nearby privately-owned properties.</i></p> <p>Action Item #18: Improve the flow of stormwater on Clark Farm Road by upgrading the underperforming and aging metal culvert with a larger plastic culvert. (F13)</p>	Inland Flooding & Aging Infrastructure	Department of Public Works	Local & Grants	Short Term (1 year or less: 0-12 months)	High Cost (\$10,000 or more)
1-2	<p>Problem Statement: <i>The Woodstock Emergency Operations Plan (EOP) was last updated in 2014 and has passed the recommended 5-year expiration. The EOP should be updated again as soon as possible.</i></p> <p>Action Item #19: Update the Woodstock Emergency Operations Plan to coincide with the state 15-ESF format; include an analysis of the impact of natural hazards on Critical Infrastructure & Key Resources that may be needed during an emergency. As part of the EOP, include an EOC Call Alert List as well as a detailed Resource Inventory List and Player Packets. (MU6) (Tables 6.1 & 7.1)</p>	All Hazards	Emergency Management Director	Local & Grants	Short Term (1 year or less: 0-12 months)	Medium Cost (\$1,000 - \$10,000)
2-1	<p>Problem Statement: <i>The Lin-Wood School, which would make an ideal location for a 2-town Primary Shelter, does not have a permanent generator.</i></p> <p>Action Item #20: Working with SAU 68, the Lin-Wood School Board and the Town of Lincoln obtain and install a generator at the Lin-Wood School so that this facility can be used as the Primary Shelter for both Lincoln and Woodstock during a disaster or hazardous event. (MU13) (Table 7.1)</p>	All Hazards	Emergency Management	Local & Grants	Medium Term (2-3 years: 13-36 months)	High Cost (\$10,000 or more)
2-2	<p>Problem Statement: <i>The 18" metal culvert on Thornton Gore Road is aging, and the bottom is rotting out, thus creating potential flooding and road erosion.</i></p> <p>Action Item #21: Improve the flow of stormwater to prevent flooding on Thornton Gore Road by improving the 18" metal culvert by adding a plastic "sleeve" that will help mitigate the potential for flooding and road erosion. By installing a "sleeve" at this site, the town is minimizing the impact of the project on its citizens. (F13)</p>	Inland Flooding & Aging Infrastructure	Department of Public Works	Local & Grants	Medium Term (2-3 years: 13-36 months)	High Cost (\$10,000 or more)
2-3	<p>Problem Statement: <i>The 12" metal culvert on Gray Squirrel Road is aging, and the bottom is rotting out, thus creating flooding and road erosion.</i></p> <p>Action Item #22: Improve the flow of stormwater to prevent flooding on Gray Squirrel Road by improving the 12" metal underperforming culvert with a 15" plastic culvert. (F13)</p>	Inland Flooding & Aging Infrastructure	Department of Public Works	Local & Grants	Medium Term (2-3 years: 13-36 months)	High Cost (\$10,000 or more)
2-4	<p>Problem Statement: <i>The Town of Woodstock has a Building Inspector (not a Code Enforcement Officer). The permitting process requires builders to abide by BOCA codes, which have been adopted by the State of New Hampshire and the town. However, the building permit and process have not been reviewed in some time.</i></p> <p>Action Item #23: The Select Board and Planning Board, in coordination with the Building Inspector, will review the building permit and building process for improvements to reduce the risks to structures that can result from natural hazards and to educate the public on the BOCA codes. (EQ1, SW1, WW1, MU4) (Table 6.1)</p>	All Hazards, Earthquake, High Wind Events, Severe Winter Weather	Select Board, Planning Board, Department of Public Works, Building Inspector & other departments as deemed necessary	Local	Medium Term (2-3 years: 13-36 months)	Low Cost (\$0 - \$1,000 or staff time only)

Final R/P	Problem Statement New Mitigation Action Item	Type of Hazard	Responsible Department	Funding or Support	Time Frame	Est. Cost
2-5	<p>Problem Statement: <i>The Planning Board has used the prior Hazard Mitigation Plan and the Rural Fire Water Resource Plan in the past when reviewing or discussing changes in the Subdivision Regulations. The Subdivision Regulations were last updated in 2011 and are ready for a review.</i></p> <p>Action Item #24: Review and update the Subdivision Regulations to consider changes that could potentially reduce the impact of future hazards. Consider new regulations regarding water resource availability for firefighting, stormwater flow, the steepness of driveways and building on steep slopes in new subdivisions. Continue to consider mitigation items from this plan and the Rural Fire Water Resource Plan in any future updates. (MU6) (Tables 6.1 & 7.1)</p>	All Hazards	Planning Board & Select Board	Local	Medium Term (2-3 years: 13-36 months)	Low Cost (\$0 - \$1,000 or staff time only)
2-6	<p>Problem Statement: <i>Although the Fire Department receives the regular notification of the burning index from NH Forest & Lands, there are no fire danger signs in the community that can provide this notification to citizens and visitors.</i></p> <p>Action Item #25: Research options and consider purchasing a fire danger sign or signs and establish appropriate locations to warn residents and visitors of the daily fire danger. Also, determine who will be responsible for monitoring and updating the sign. (WF11) (Table 6.1)</p>	Wildfire & Conflagration	Fire Department	Local & Grants	Medium Term (2-3 years: 13-36 months)	Medium Cost (\$1,000 - \$10,000)
3-1	<p>Problem Statement: <i>"Dead" spots in the town's communication system have the potential to cause significant problems with emergency communication.</i></p> <p>Action Item #26: Research and obtain repeaters to help eliminate "dead" spots in the town's emergency communication system. (Tables 6.1 & 7.1)</p>	All Hazards	Police Department & Grafton County Dispatch	Local & Grants	Long Term (3-5 years: 37-60 months)	High Cost (\$10,000 or more)
3-2	<p>Problem Statement: <i>The Woodstock DPW Garage is located on the banks of the Pemigewasset River. The riverbanks along the river erode each time there is an inland high water event.</i></p> <p>Action Item #27: To protect this important critical facility, obtain funding and engineering studies to move the Woodstock DPW Garage from its current location on the banks of the Pemigewasset River to another location (already identified) that is free from inland flooding, erosion and other natural hazards. (MU13)</p>	Inland Flooding (Erosion)	Select Board, Planning Board, Department of Public Works & Building Inspector	Local & Grants	Long Term (3-5 years: 37-60 months)	High Cost (\$10,000 or more)
3-3	<p>Problem Statement: <i>The water line in lower Woodstock on Route 3 is aging. The team felt that this water line could fail in the future, creating sinkholes, potential road damage and a lack of good drinking water.</i></p> <p>Action Item #28: Obtain funding and replace the aging water line in lower Woodstock along Route 3 to prevent future road problems such as sinkholes, poor water quality or lack of water, road erosion and potential flooding. (MU13)</p>	Aging Infrastructure & Inland Flooding (Erosion)	Select Board, Planning Board, Department of Public Works	Local & Grants	Long Term (3-5 years: 37-60 months)	High Cost (\$10,000 or more; will need to hire an outside contractor)
3-4	<p>Problem Statement: <i>The southern part of the Main Street curbing project has not been completed.</i></p> <p>Action Item #29: Complete the southern part of the Main Street curbing project to manage the flow of stormwater better. (F13) (Table 7.1)</p>	Inland Flooding	Department of Public Works	Local	Long Term (3-5 years: 37-60 months)	High Cost (\$10,000 or more)

Chapter 10: Adopting, Monitoring, Evaluating and Updating the Plan

A. HAZARD MITIGATION PLAN MONITORING, EVALUATION AND UPDATES

A good mitigation plan must allow for updates where and when necessary. It will incorporate periodic monitoring and evaluation mechanisms to allow for review of successes and failures or even just simple updates.

The Woodstock Hazard Mitigation Plan Update, 2020, is considered a work in progress. There are three situations which will prompt revisiting this plan:

- *First, as a minimum, it will be reviewed annually or after an emergency event to assess whether the existing and suggested mitigation action items were successful. This review will focus on the assessment of the plan's effectiveness, accuracy and completeness in the monitoring of the implementation action items. The review will also address recommended improvements to the plan as contained in the FEMA plan review checklist and address any weaknesses the town identified that the plan did not adequately address.*
- *Second, the plan will be thoroughly updated every five years.*
- *Third, if the town adopts any major modifications to its land-use planning documents, the jurisdiction will conduct a plan review and make changes as applicable.*

In keeping with the process of adopting this hazard mitigation plan, the public and stakeholders will have the opportunity for future involvement as they will be invited to participate in any future reviews or updates of this plan. Public notice before any review or update will be given by such means as press releases in local papers, using available social media, posting meeting information on the town website and at the Town Offices, sending letters to federal, state and local organizations impacted by the plan and posting notices in public places. This will ensure that all comments and revisions from the public and stakeholders will be considered. The Emergency Management Director is responsible for initiating plan reviews and will consult with members of the hazard mitigation planning team identified in this plan.

Review forms to be used for post-hazard or annual reviews are available in Chapter 11 of this plan. The town is encouraged to use these forms to document any changes and accomplishments. Forms are available for years 1-4, with the expectation that the five-year annual update will be in process during the fifth year.

B. INTEGRATION WITH OTHER PLANS

This plan will only enhance mitigation if balanced with all other town plans. Woodstock completed its last hazard mitigation plan in 2014 and has completed many projects from that plan. Examples of these can be found in Table 7.1 and include items such as providing ongoing fire and flood education, improving a culvert on Reservoir Road, upgrading communications dead-spots and establishing an emergency webpage. The town was able to integrate these actions into other town activities, budgets, plans and mechanisms.

The town will incorporate elements from this plan into the following documents:

WOODSTOCK MASTER PLAN

Traditionally, Master Plans are updated every 5 to 10 years and detail the use of capital reserves funds and capital improvements within the town. A complete update of the Woodstock's Master Plan was completed in 2014 and is due for a recommended update in 2024. Future updates of the Master Plan will include a Natural Hazards section and will integrate concepts, ideas and action items from this Hazard Mitigation Plan. **(Action Item #5)**

WOODSTOCK EMERGENCY OPERATIONS PLAN 2014 (EOP)

The EOP is designed to allow the town to respond more effectively to disasters as well as mitigate the risk to people and property. EOPs are generally reviewed after each hazardous event and updated on a five-year basis. The last Woodstock EOP was completed in 2014. An update for the Emergency Operations Plan is expected to be completed in 2020 or 2021. The new EOP will include elements from this hazard mitigation plan. **(Action Items #19)**

TOWN BUDGET & CAPITAL RESERVE FUNDS

The Town of Woodstock maintains Capital Reserve Funds (CRF) for major expenditures. The Capital Reserve Funds are adjusted annually in coordination with the Select Board and the town's department heads at budget time. The budget is then voted on at the annual Town Meeting. During the annual budget planning process, specific mitigation actions identified in this plan that require town fiscal support will be reviewed for incorporation into the budget. **Refer to those Action Items that require local money or match money or address the CRF.**

THE WOODSTOCK ORDINANCES & SUBDIVISION REGULATIONS

As time goes by and the needs of the town change, the town's planning mechanisms will be reviewed and updated. In coordination with these actions, the Planning Board will review this plan and incorporate any changes that help mitigate the susceptibility of the community and its citizens to the dangers of natural, technical or human-caused disasters. An example(s) of this integration can be seen in this plan's mitigation action item. **(Action Items #23 & #24)**

The local governments will modify other plans and actions as necessary to incorporate hazard or wildfire issues. The Select Board ensures this process will be followed in the future. Also, the town will review and make a note of instances when this has been done and include it as part of their annual review of the plan.

C. PLAN APPROVAL & ADOPTION

This plan was completed in a series of open meetings beginning on February 6, 2019. The plan was presented to the town for review, submitted to HSEM for Conditional Approval (*APA, Approved Pending Adoption*), formally adopted by the Select Board and resubmitted to HSEM for Final Approval. Once Final Approval from HSEM was met, copies of the plan were distributed to the town, HSEM, FEMA, DNCR and the USDA-FS; the plan was then distributed as these entities saw fit. Copies of the plan remain on file at Mapping and Planning Solutions (MAPS) in both digital and paper formats.

Chapter 11: Signed Community Documents and Approval Letters

A. PLANNING SCOPE OF WORK & AGREEMENT

PLANNING SCOPE OF WORK & AGREEMENT

HAZARD MITIGATION PLAN UPDATE



PARTIES TO THE AGREEMENT

Mapping and Planning Solutions
Town of Woodstock, NH

Current Plan Expiration: 10/5/2019
PDM Grant Expiration: 1/30/2021

This agreement between the Town of Woodstock (the town) or its official designee and Mapping and Planning Solutions (MAPS) outlines the town's desire to engage the services of MAPS to assist in planning and technical services in order to produce the 2019 Hazard Mitigation Plan Update (the Plan).

Agreement

This agreement outlines the responsibilities that will ensure that the plan is developed in a manner that involves Town members and local, federal and state emergency responders and organizations. The agreement identifies the work to be done by detailing the specific tasks, schedules and finished products that are the result of the planning process.

The goal of this agreement is that the plan and planning process be consistent with Town policies and that it accurately reflects the values and individuality of the town. This is accomplished by forming a working relationship between the town's citizens, the planning team and MAPS.

The plan created as a result of this agreement will be presented to the town for adoption once conditional approval is received from FEMA. When adopted, the plan provides guidance to the town, commissions, and departments; adopted plans serve as a guide and do not include any financial commitments by the town. Additionally, all adopted plans should address mitigation strategies for reducing the risk of natural, man-made, and wildfire disasters on life and property and written so that they may be integrated within other Town planning initiatives.

Scope of Work

MAPS - Responsibilities include, but are not limited to, the following:

- MAPS will collect data that is necessary to complete the plan and meet the requirements of the FEMA Plan Review Tool by working with the planning team (the team) and taking public input from community members.
- With the assistance of the team, MAPS will coordinate and facilitate meetings and provide any materials, handouts and maps necessary to provide a full understanding of each step in the planning process.
- MAPS will assist the team in the development of goals, objectives and implementation strategies and clearly define the processes needed for future plan monitoring, educating the public and integrating the plan with other Town plans and activities.

- MAPS will coordinate and collaborate with other federal, state and local agencies throughout the process.
- MAPS will explain and delineate the town's Wildland Urban Interface (WUI) and working with the team, will establish a list of potential hazards and analyze the risk severity of each.
- MAPS will author, edit and prepare the plan for review by the team prior to submitting the plan to FEMA for conditional approval. Upon conditional approval by FEMA, MAPS will assist the planning team as needed with presentation of the plan to the Woodstock Select Board and/or Planning Board and continue to work with the town until final approval and distribution of the plan is complete, unless extraordinary circumstances prevail.
- MAPS shall provide, at its office, all supplies and space necessary to complete the Woodstock Hazard Mitigation Plan.
- After final approval is received from FEMA, MAPS will provide the town with a two copies of the plan containing all signed documents, approvals and GIS maps along with CDs containing these same documents in digital form, for distribution by the town as it sees fit. Additional CDs may be requested at no additional cost. CD copies of the plan will be distributed by MAPS to collaborating agencies including, but not limited to, NH Homeland Security (HSEM) and FEMA.
- MAPS will provide plan maintenance reminders and assistance on an annual basis leading up to the next five-year plan update at no cost to the town, if requested by the town.

The Town - Responsibilities include but are not limited to the following:

- The town shall insure that the planning team includes members who are able to support the planning process by identifying available town resources including people who will have access to and can provide pertinent data. The planning team should include, but not be limited to, such Town members as the local Emergency Management Director, the Fire, Ambulance and Police Chiefs, members of the Select Board and the Planning Board, the Public Works Director or Road Agent, representatives from relevant federal and state organizations, other local officials, property owners, and relevant businesses or organizations.
- The town shall determine a lead contact to work with MAPS. This contact shall assist with recruiting participants for planning meetings, including the development of mailing lists when and if necessary, distribution of flyers, and placement of meeting announcements. In addition, this contact shall assist MAPS with organizing public meetings to develop the plan and offer assistance to MAPS in developing the work program which will produce the Plan.
- The town shall gain the support of stakeholders for the recommendations found within the Plan.
- The town shall provide public access for all meetings and provide public notice at the start of the planning process and at the time of adoption, as required by FEMA.
- The proposed plan shall be submitted to the Select Board and/or Planning Board for consideration and adoption.
- After adoption and final approval from FEMA is received, the town will:
 - *Distribute copies of the plan as it sees fit throughout the local community.*
 - *Develop a team to monitor and work toward plan implementation.*
 - *Publicize the plan to the community and insure citizen awareness.*
 - *Urge the Planning Board to incorporate priority projects into the town's Capital Improvement Plan (if available).*
 - *Integrate mitigation strategies and priorities from the plan into other town planning documents.*

Terms

- **Fees & Payment Schedule:** The contract price is limited to \$7,500.00; an invoice will be sent to the town for each payment as outlined below.
 - 1. Initial payment upon signing of this contract and receipt of first invoice\$3,700.00
 - 2. Second payment upon plan submittal to FEMA for Conditional Approval\$3,600.00
 - 3. Final payment upon project completion and receipt of final plan copy\$200.00
 - Total Fees.....\$7,500.00

- **Payment Procedures:** The payment procedure is as follows:
 - MAPS will invoice the town
 - The town will pay MAPS
 - The town will forward the MAPS invoice along with an invoice from the town on letterhead to HSEM
 - HSEM will reimburse the town for the monies paid to MAPS

All payments to MAPS are fully reimbursable to the town by Homeland Security & Emergency Management.

- **Required Matching Funds:** The Town of Woodstock will be responsible to provide and document any and all resources to be used to meet the FEMA required matching funds in the amount of \$2,500. Matching funds are the responsibility of the Town of Woodstock, not MAPS. Mapping and Planning Solutions will however assist the town with attendance tracking by asking meeting attendees to “sign in” at all meetings and to “log” any time spent outside of the meetings working on this project. MAPS will provide the town with final attendance records in spreadsheet form at project’s end for the town to use in its match fulfillment.

- **Project Period:** This project shall begin upon signing this agreement by both parties and continue through a date yet to be determined or whenever the planning process is complete. The project period may be extended by mutual written agreement between the town, MAPS and Homeland Security if required. The actual project end date is dependent upon timely adoptions and approvals which may be outside of the control of MAPS and the town. It is anticipated that five or six two-hour meetings will be required to gather the necessary information to create the updated the Plan.

The grant provided for this project is funded through PDM17; per the grant agreement between the town and HSEM, all work must be completed by January 30, 2021. It is expected that this project will be completed long before the grant expiration date of January 30, 2021.

- **Ownership of Material:** All maps, reports, documents and other materials produced during the project period shall be owned by the town; each party may keep file copies of any generated work. MAPS shall have the right to use work products collected during the planning process; however, MAPS shall not use any data in such a way as to reveal personal or public information about individuals or groups which could reasonably be considered confidential.

- **Termination:** This agreement may be terminated if both parties agree in writing. In the event of termination, MAPS shall forward all information prepared to date to the town. MAPS shall be entitled to recover its costs for any work that was completed.

- **Limit of Liability:** MAPS agrees to perform all work in a diligent and efficient manner according to the terms of this agreement. MAPS' responsibilities under this agreement depend upon the cooperation of the Town of Woodstock. MAPS and its employees, if any, shall not be liable for opinions rendered, advice, or errors resulting from the quality of data that is supplied. Adoption of the plan by the town and final approval of the plan by FEMA, relieve MAPS of content liability. Mapping and Planning Solutions carries annual general liability insurance.

- **Amendments:** Changes, alterations or additions to this agreement may be made if agreed to in writing between both the Town of Woodstock and Mapping and Planning Solutions.
- **About Mapping and Planning Solutions:** Mapping and Planning Solutions provides hazard mitigation and emergency operations planning throughout New Hampshire. Mapping and Planning Solutions has developed more than forty Hazard Mitigation Plans, more than forty five Emergency Operations Plans and has completed the following FEMA courses in Emergency Planning and Operations:
 - Introduction to Incident Command System, IS-100.a
 - ICS Single Resources and Initial Action Incidents, IS-200.a
 - National Incident Management System (NIMS) An Introduction, IS-700.a
 - National Response Framework, An Introduction, IS 800.b
 - Emergency Planning, IS-235
 - Homeland Security Exercise & Evaluation Program (HSEEP)
 - IS-547.a – Introduction to Continuity Operations
 - IS-546.a – Continuity of Operations (COOP) Awareness Course
 - G-318; Preparing & Review Hazard Mitigation Plans
 - Climate Change Adaptation Planning, AWR-347
 - ALICE; School Shooting Workshop, Littleton High School

➤ **Contacts:**

For Mapping & Planning Solutions

June Garneau
Mapping and Planning Solutions
105 Union Street
Whitefield, NH 03598
jgarneau@mappingandplanning.com
(603) 837-7122; (603) 991-9664 (cell)

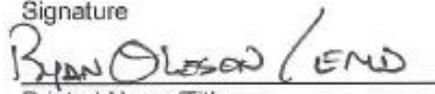
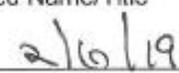
For the Town

Ryan Oleson, Police Chief & EMD
Town of Woodstock
165 Lost River Road
PO Box 23
Woodstock, NH 03262
r.oleson@woodstocknh.org
(603) 745-8700

Signature below indicates acceptance of and agreement to details outlined in this agreement

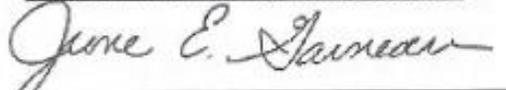
FOR THE TOWN OF WOODSTOCK, NH



Signature

Printed Name/Title


Date

FOR MAPPING AND PLANNING SOLUTIONS



Signature
June Garneau, Owner
February 1, 2019

Signatures are scanned facsimiles, original signatures are on file.

B. APPROVED PENDING ADOPTION (APA) & FORMAL APPROVAL EMAILS FROM HSEM**APA FROM HSEM****Woodstock, NH - Approvable Pending Adoption**

Hazard Mitigation Planning <hazmitplanning@DOS.NH.GOV>

● You replied to this message on 12/8/2020 2:47 PM.

Sent: Tue 12/8/2020 2:35 PM

To: June Garneau; Ryan Oleson ; July Welch

Cc: Hatch, Paul; Wells, Meghan

Good afternoon,

The Department of Safety, Division of Homeland Security & Emergency Management (HSEM) has completed its review of the Woodstock, NH Hazard Mitigation Plan and found it approvable pending adoption. Congratulations on a job well done!

With this approval, the jurisdiction meets the local mitigation planning requirements under 44 CFR 201 **pending HSEM's receipt of electronic copies of the adoption documentation and the final plan.**

Acceptable electronic formats include Word or PDF files and must be submitted to us via email at HazardMitigationPlanning@dos.nh.gov. Upon HSEM's receipt of these documents, notification of formal approval will be issued, along with the final Checklist and Assessment.

The approved plan will be submitted to FEMA on the same day the community receives the formal approval notification from HSEM. FEMA will then issue a Letter of Formal Approval to HSEM for dissemination that will confirm the jurisdiction's eligibility to apply for mitigation grants administered by FEMA and identify related issues affecting eligibility, if any. If the plan is not adopted within one calendar year of HSEM's Approval Pending Adoption, the jurisdiction must update the entire plan and resubmit it for HSEM review.

If you have questions or wish to discuss this determination further, please contact me at Kayla.Henderson@dos.nh.gov or 603-223-3650.

Thank you for submitting the Woodstock, NH Hazard Mitigation Plan and again, congratulations on your successful community planning efforts.

Sincerely,

Kayla J. Henderson

Hazard Mitigation Planning

State of New Hampshire, Department of Safety

Division of Homeland Security & Emergency Management

Meghan Wells, State Hazard Mitigation Officer / Meghan.K.Wells@dos.nh.gov / (603) 223-4395Kayla Henderson, State Hazard Mitigation Planner / Kayla.J.Henderson@dos.nh.gov / (603) 223 3650Whitney Welch, Assistant Chief of Planning / Whitney.A.Welch@dos.nh.gov / (603) 223-3667

Signatures are scanned facsimile, original signatures are on file.

FORMAL APPROVAL FROM HSEM

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INSERTION OF FORMAL APPROVAL EMAIL
FROM HSEM WHEN RECEIVED.

Signatures are scanned facsimile, original signatures are on file.

C. SIGNED CERTIFICATE OF ADOPTION

CERTIFICATE OF ADOPTION

WOODSTOCK, NH

SELECT BOARD

A RESOLUTION ADOPTING THE TOWN OF WOODSTOCK HAZARD MITIGATION PLAN UPDATE 2020

WHEREAS, the Town of Woodstock has historically experienced severe damage from natural hazards, and it continues to be vulnerable to the effects of those natural hazards profiled in this plan, resulting in loss of property and life, economic hardship and threats to public health and safety; and

WHEREAS, the Town of Woodstock has developed and received conditional approval from the Homeland Security & Emergency Management (HSEM) for its Hazard Mitigation Plan Update 2020 under the requirements of 44 CFR 201.6; and

WHEREAS, public and committee meetings were held between February 6, 2019, and September 25, 2019, regarding the development and review of the Hazard Mitigation Plan Update 2020 and

WHEREAS, the plan specifically addresses hazard mitigation strategies and plan maintenance procedure for the Town of Woodstock; and

WHEREAS, the plan recommends several hazard mitigation actions/projects that will provide mitigation for specific natural hazards that impact the Town of Woodstock with the effect of protecting people and property from loss associated with those hazards; and

WHEREAS, adoption of this plan will make the Town of Woodstock eligible for funding to alleviate the impacts of future hazards; now, therefore, be it

RESOLVED by the Select Board:

1. The plan is hereby adopted as an official plan of the Town of Woodstock;
2. The respective officials identified in the mitigation action items of the plan are hereby directed to pursue implementation of the recommended actions assigned to them;

Woodstock, Hazard Mitigation Plan Update Certificate of Adoption, page two

- 3. Future revisions and plan maintenance required by 44 CFR 201.6 and FEMA are hereby adopted as a part of this resolution for a period of five (5) years from the date of this resolution;
- 4. An annual report on the progress of the implementation elements of the plan shall be presented to the Select Board by the Emergency Management Director.

Adopted this day, the _____ of _____, 2020

Chairman of the Select Board

Member of the Select Board

Signature

Signature

Print Name

Print Name

Member of the Select Board

Emergency Management Director

Signature

Signature

Print Name

Print Name

IN WITNESS WHEREOF, the undersigned has affixed his/her signature and the corporate seal of the Town of Woodstock on this day, _____, 2020

Notary

Expiration

Date

Signatures are scanned facsimile; original signatures are on file.

D. FORMAL APPROVAL LETTER FEMA

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FEMA WHEN RECEIVED.

Signatures are scanned facsimile; original signatures are on file.

E. CWPP APPROVAL LETTER FROM DNCR

**Woodstock, NH
A Resolution Approving the
Woodstock Hazard Mitigation Plan Update 2020
As a Community Wildfire Protection Plan**

Several public meetings and committee meetings were held between February 6, 2019, and September 25, 2019, regarding the development and review of the Woodstock Hazard Mitigation Plan Update 2020. The Woodstock Hazard Mitigation Plan Update 2020 contains potential future projects to mitigate hazard and wildfire damage in the Town of Woodstock.

The Fire Chief, along with the Select Board and the Emergency Management Director, requests that this plan and be accepted by the Department of Natural and Cultural Resources (DNCR) as a Community Wildfire Protection Plan, having adhered to the requirements of said plan.

The Select Board, the Emergency Management Director and the Fire Chief approve the Woodstock Hazard Mitigation Plan Update 2020 and understand that with approval by DNCR, this plan will also serve as a Community Wildfire Protection Plan.

For the Town of Woodstock

APPROVED and SIGNED this day, _____, 2020.

Chairman of the Select Board

Printed Name

Fire Chief

Printed Name

Emergency Management Director

Printed Name

For the Department of Natural & Cultural Resources (DNCR)

APPROVED and SIGNED this day, _____, 2020.

Forest Ranger – NH Division of Forest and Lands, DNCR

APPROVED and SIGNED this day, _____, 2020.

Director – NH Division of Forest and Lands, DNCR

Signatures are scanned facsimile; original signatures are on file.

F. ANNUAL REVIEW OR POST HAZARD CONCURRENCE FORMS

YEAR ONE

CHECK ALL THAT APPLY

- Annual Review & Concurrence - **Year One:** _____ (Date)
- Annual Review & Concurrence – Post Hazardous Event: _____ (Event/Date)
- Annual Review & Concurrence – Post Hazardous Event: _____ (Event/Date)

The Town of Woodstock, NH shall execute this page annually by the members of the town’s governing body and the town’s designated Emergency Management Director after inviting the public to attend any and all hearings that pertain to this annual or post hazard review or update by means such as press releases in local papers, posting meeting information on the town website and at the Town Offices, sending letters to federal, state local organizations impacted by the plan posting notices in public places in the town.

Woodstock, NH
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: _____

SIGNATURE: _____

PRINTED NAME: _____

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: _____

PRINTED NAME: _____

Chairman of the Select Board

Changes and notes regarding the 2020 Hazard Mitigation Plan Update

Please use the reverse side for additional notes 

YEAR TWO

CHECK ALL THAT APPLY

- Annual Review & Concurrence - **Year Two**: _____ (Date)
- Annual Review & Concurrence – Post Hazardous Event: _____ (Event/Date)
- Annual Review & Concurrence – Post Hazardous Event: _____ (Event/Date)

The Town of Woodstock, NH shall execute this page annually by the members of the town’s governing body and the town’s designated Emergency Management Director after inviting the public to attend any and all hearings that pertain to this annual or post hazard review or update by means such as press releases in local papers, posting meeting information on the town website and at the Town Offices, sending letters to federal, state local organizations impacted by the plan posting notices in public places in the town.

Woodstock, NH
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: _____

SIGNATURE: _____

PRINTED NAME: _____

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: _____

PRINTED NAME: _____

Chairman of the Select Board

Changes and notes regarding the 2020 Hazard Mitigation Plan Update

Please use the reverse side for additional notes 

YEAR THREE

CHECK ALL THAT APPLY

- Annual Review & Concurrence - **Year Three:** _____ (Date)
- Annual Review & Concurrence – Post Hazardous Event: _____ (Event/Date)
- Annual Review & Concurrence – Post Hazardous Event: _____ (Event/Date)

The Town of Woodstock, NH shall execute this page annually by the members of the town’s governing body and the town’s designated Emergency Management Director after inviting the public to attend any and all hearings that pertain to this annual or post hazard review or update by means such as press releases in local papers, posting meeting information on the town website and at the Town Offices, sending letters to federal, state local organizations impacted by the plan posting notices in public places in the town.

Woodstock, NH
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: _____

SIGNATURE: _____

PRINTED NAME: _____

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: _____

PRINTED NAME: _____

Chairman of the Select Board

Changes and notes regarding the 2020 Hazard Mitigation Plan Update

Please use the reverse side for additional notes 

YEAR FOUR

CHECK ALL THAT APPLY

- Annual Review & Concurrence - **Year Four**: _____ (Date)
- Annual Review & Concurrence – Post Hazardous Event: _____ (Event/Date)
- Annual Review & Concurrence – Post Hazardous Event: _____ (Event/Date)

The Town of Woodstock, NH shall execute this page annually by the members of the town’s governing body and the town’s designated Emergency Management Director after inviting the public to attend any and all hearings that pertain to this annual or post hazard review or update by means such as press releases in local papers, posting meeting information on the town website and at the Town Offices, sending letters to federal, state local organizations impacted by the plan posting notices in public places in the town.

Woodstock, NH
Hazard Mitigation Plan Update

REVIEWED AND APPROVED

DATE: _____

SIGNATURE: _____

PRINTED NAME: _____

Emergency Management Director

CONCURRENCE OF APPROVAL

SIGNATURE: _____

PRINTED NAME: _____

Chairman of the Select Board

Changes and notes regarding the 2020 Hazard Mitigation Plan Update

Please use the reverse side for additional notes 

Chapter 12: Appendices

- APPENDIX A: BIBLIOGRAPHY
- APPENDIX B: TECHNICAL AND FINANCIAL ASSISTANCE FOR HAZARD MITIGATION
 - *Hazard Mitigation Grant Program (HMGP)*
 - *Pre-Disaster Mitigation (PDM)*
 - *Flood Mitigation Assistance (FMA)*
 - *Repetitive Flood Claims (RFC)*
 - *Severe Repetitive Loss (SRL)*
- APPENDIX C: THE EXTENT OF HAZARDS
- APPENDIX D: MAJOR DISASTER & EMERGENCY DECLARATIONS
- APPENDIX E: ACRONYMS
- APPENDIX F: POTENTIAL MITIGATION IDEAS

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APPENDIX A: BIBLIOGRAPHY**Documents**

- **Local Hazard Mitigation Planning Review Guide**, FEMA, October 2011
- **Local Hazard Mitigation Planning Handbook**, FEMA, March 2013
- **Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards**, FEMA, January 2013
- **Hazard Mitigation Unified Guidance**, FEMA, July 12, 2013
- **Hazard Mitigation Assistance Guidance**, FEMA, February 27, 2015
- **Hazards Mitigation Plans**
 - Woodstock Hazard Mitigation Plan, 2014
 - Groton Hazard Mitigation Plan, 2019
 - Randolph Hazard Mitigation Plan, 2019
 - Kingston Hazard Mitigation Plan, 2019
- **NH State Multi-Hazard Mitigation Plan**, 2018
 - https://prd.blogs.nh.gov/dos/hsem/wp-content/uploads/2015/11/State-of-New-Hampshire-Multi-Hazard-Mitigation-Plan-Update-2018_FINAL.pdf
- **NH Division of Forests and Lands Quarterly Update**
 - <http://www.nhdf.org/fire-control-and-law-enforcement/fire-statistics.aspx>
- **Disaster Mitigation Act (DMA) of 2000**, Section 101, b1 & b2 and Section 322a
 - <http://www.fema.gov/library/viewRecord.do?id=1935>
- **Economic & Labor Market Information Bureau**, NH Employment Security, July 2019; Community Response for Woodstock, Received, 8/07/2018, Census 2000 and Revenue Information derived from this site;
 - <http://www.nhes.nh.gov/elmi/products/cp/profiles-htm/Woodstock.htm>

Photos

- Photos are taken by MAPS unless otherwise noted.

Wildfire Links

- US Forest Service; <http://www.fs.fed.us>
- US Fire Administration; <http://www.usfa.dhs.gov/>
- US Department of Agriculture Wildfire Programs; <http://www.wildfireprograms.usda.gov/>
- Firewise®; <http://www.firewise.org/>
- Fire Adapted Communities; www.fireadapted.org
- Wildfire Preparedness Guide to Forest Wardens; www.quickseries.com
- Ready Set Go; www.wildlandfires.org
- Fire education for children; www.smokeybear.com

Additional Websites

- NH Homeland Security & Emergency Management; <http://www.nh.gov/safety/divisions/hsem/>
- US Geological Society; <http://water.usgs.gov/ogw/subsidence.html>
- Department Environmental Services;
<http://des.nh.gov/organization/divisions/water/dam/drought/documents/historical.pdf>
- The Disaster Center (NH); <http://www.disastercenter.com/newhamp/tornado.html>
- Floodsmart, about the NFIP; http://www.floodsmart.gov/floodsmart/pages/about/nfip_overview.jsp
- NOAA, National Weather Service; <http://www.nws.noaa.gov/glossary/index.php?letter=w>
- NOAA, Storm Prediction Center; <http://www.spc.noaa.gov/faq/tornado/beaufort.html>
- National Weather Service; http://www.nws.noaa.gov/om/cold/wind_chill.shtml
- Center for Disease Control; <https://www.cdc.gov/disasters/winter/index.html>
- Slate; <http://www.slate.com/id/2092969/>
- NH Office Strategic Initiatives; <http://www.nh.gov/osi/>
- Code of Federal Regulations; Title 14, Aeronautics and Space; Part 1, Definitions and Abbreviations;
https://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title14/14tab_02.tpl
- Federal Aviation Administration; <http://faa.custhelp.com>
- US Legal, Inc.; <http://definitions.uslegal.com/v/violent-crimes/>

APPENDIX B: TECHNICAL & FINANCIAL ASSISTANCE FOR HAZARD MITIGATION

FEMA's Hazard Mitigation Assistance (HMA) grant programs provide funding for eligible mitigation activities that reduce disaster losses and protect life and property from future disaster damages. Currently, FEMA administers the following HMA grant programs³⁰:

- Hazard Mitigation Grant Program (HMGP)
- Pre-Disaster Mitigation (PDM)
- Flood Mitigation Assistance (FMA)
- Repetitive Flood Claims (RFC)
- Severe Repetitive Loss (SRL)

FEMA's HMA grants are provided to eligible applicants (states/tribes/territories) that, in turn, provide sub-grants to local governments and communities. The applicant selects and prioritizes subapplications developed and submitted to them by subapplicants. These subapplications are submitted to FEMA for consideration of funding.

Prospective subapplicants should consult the office designated as their applicant for further information regarding specific program and application requirements. Contact information for the FEMA Regional Offices and State Hazard Mitigation Officers is available on the FEMA website, www.fema.gov.

HMA Grant Programs

The HMA grant programs provide funding opportunities for pre- and post-disaster mitigation. While the statutory origins of the programs differ, all share the common goal of reducing the risk of loss of life and property due to natural hazards. Brief descriptions of the HMA grant programs can be found below.

A. Hazard Mitigation Grant Program (HMGP)

HMGP assists in implementing long-term hazard mitigation measures following Major Disaster Declarations. Funding is available to implement projects in accordance with state, tribal and local priorities.

Table 3: Eligible Activities by Program

Eligible Activities	HMGP	PDM	FMA
1. Mitigation Projects	✓	✓	✓
Property Acquisition and Structure Demolition	✓	✓	✓
Property Acquisition and Structure Relocation	✓	✓	✓
Structure Elevation	✓	✓	✓
Mitigation Reconstruction	✓	✓	✓
Dry Floodproofing of Historic Residential Structures	✓	✓	✓
Dry Floodproofing of Non-residential Structures	✓	✓	✓
Generators	✓	✓	
Localized Flood Risk Reduction Projects	✓	✓	✓
Non-localized Flood Risk Reduction Projects	✓	✓	
Structural Retrofitting of Existing Buildings	✓	✓	✓
Non-structural Retrofitting of Existing Buildings and Facilities	✓	✓	✓
Safe Room Construction	✓	✓	
Wind Retrofit for One- and Two-Family Residences	✓	✓	
Infrastructure Retrofit	✓	✓	✓
Soil Stabilization	✓	✓	✓
Wildfire Mitigation	✓	✓	
Post-Disaster Code Enforcement	✓		
Advance Assistance	✓		
5 Percent Initiative Projects	✓		
Miscellaneous/Other ⁽¹⁾	✓	✓	✓
2. Hazard Mitigation Planning	✓	✓	✓
Planning Related Activities	✓		
3. Technical Assistance			✓
4. Management Cost	✓	✓	✓

⁽¹⁾ Miscellaneous/Other indicates that any proposed action will be evaluated on its own merit against program requirements. Eligible projects will be approved provided funding is available.

Eligibility Chart taken from Hazard Mitigation Assistance Guidance, February 27, 2015

³⁰ Information in Appendix B is taken from the following website and links to specific programs unless otherwise noted http://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf

What is the Hazard Mitigation Grant Program?

The Hazard Mitigation Grant Program (HMGP) provides grants to states and local governments to implement long-term hazard mitigation measures after a major disaster declaration. Authorized under Section 404 of the Stafford Act and administered by FEMA, HMGP was created to reduce the loss of life and property due to natural disasters. The program enables mitigation measures to be implemented during the immediate recovery from a disaster.

Who is eligible to apply?

Hazard Mitigation Grant Program funding is only available to applicants that reside within a presidentially declared disaster area. Eligible applicants are

- State and local governments
- Indian tribes or other tribal organizations
- Certain non-profit organizations

Individual homeowners and businesses may not apply directly to the program; however a community may apply on their behalf.

How are potential projects selected and identified?

The state's administrative plan governs how projects are selected for funding. However, proposed projects must meet certain minimum criteria. These criteria are designed to ensure that the most cost-effective and appropriate projects are selected for funding. Both the law and the regulations require that the projects are part of an overall mitigation strategy for the disaster area.

The state prioritizes and selects project applications developed and submitted by local jurisdictions. The state forwards applications consistent with state mitigation planning objectives to FEMA for eligibility review. Funding for this grant program is limited and states and local communities must make difficult decisions as to the most effective use of grant funds.

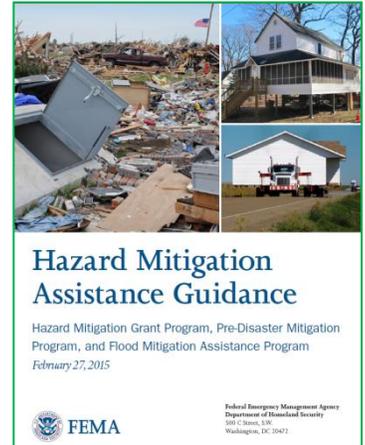
B. Pre-Disaster Mitigation (PDM)

PDM provides funds on an annual basis for hazard mitigation planning and the implementation of mitigation projects prior to a disaster. The goal of the PDM program is to reduce overall risk to the population and structures, while at the same time, also reducing reliance on federal funding from actual disaster declarations.

Program Overview

The Pre-Disaster Mitigation (PDM) program provides funds to states, territories, Indian tribal governments, communities and universities for hazard mitigation planning and the implementation of mitigation projects prior to a disaster event.

Funding these plans and projects reduces overall risks to the population and structures, while also reducing reliance on funding from actual disaster declarations. PDM grants are to be awarded on a competitive basis and without reference to state allocations, quotas, or other formula-based allocation of funds.



C. Flood Mitigation Assistance (FMA)

FMA provides funds on an annual basis so that measures can be taken to reduce or eliminate risk of flood damage to buildings insured under the National Flood Insurance Program.

Program Overview

The FMA program was created as part of the National Flood Insurance Reform Act (NFIRA) of 1994 (42 U.S.C. 4101) with the goal of reducing or eliminating claims under the National Flood Insurance Program (NFIP).

FEMA provides FMA funds to assist states and communities implement measures that reduce or eliminate the long-term risk of flood damage to buildings, manufactured homes and other structures insurable under the National Flood Insurance Program.

Types of FMA Grants

Three types of FMA grants are available to states and communities:

Planning Grants to prepare Flood Mitigation Plans. Only NFIP-participating communities with approved Flood Mitigation Plans can apply for FMA Project grants.

Project Grants to implement measures to reduce flood losses, such as elevation, acquisition, or relocation of NFIP-insured structures. States are encouraged to prioritize FMA funds for applications that include repetitive loss properties; these include structures with 2 or more losses each with a claim of at least \$1,000 within any ten-year period since 1978.

Technical Assistance Grants for the state to help administer the FMA program and activities. Up to ten percent (10%) of project grants may be awarded to states for Technical Assistance Grants

D. Repetitive Flood Claims (RFC)

RFC provides funds on an annual basis to reduce the risk of flood damage to individual properties insured under the NFIP that have had one or more claim payments for flood damages. RFC provides up to 100% federal funding for projects in communities that meet the reduced capacity requirements.

Program Overview

The Repetitive Flood Claims (RFC) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004 (P.L. 108-264), which amended the National Flood Insurance Act (NFIA) of 1968 (42 U.S.C. 4001, et al).

Up to \$10 million is available annually for FEMA to provide RFC funds to assist states and communities reduce flood damages to insured properties that have had one or more claims to the National Flood Insurance Program (NFIP).

Federal / Non-Federal Cost Share

FEMA may contribute up to 100 percent of the total amount approved under the RFC grant award to implement approved activities, if the applicant has demonstrated that the proposed activities cannot be funded under the Flood Mitigation Assistance (FMA) program.

E. Severe Repetitive Loss (SRL)

SRL provides funds on an annual basis to reduce the risk of flood damage to residential structures insured under the NFIP that are qualified as severe repetitive loss structures. SRL provides up to 90% federal funding for eligible projects.

Program Overview

The Severe Repetitive Loss (SRL) grant program was authorized by the Bunning-Bereuter-Blumenauer Flood Insurance Reform Act of 2004, which amended the National Flood Insurance Act of 1968 to provide funding to reduce or eliminate the long-term risk of flood damage to severe repetitive loss (SRL) structures insured under the National Flood Insurance Program (NFIP).

Definition

The definition of severe repetitive loss as applied to this program was established in section 1361A of the National Flood Insurance Act, as amended (NFIA), 42 U.S.C. 4102a. An SRL property is defined as a **residential property** that is covered under an NFIP flood insurance policy and:

- (a) That has at least four NFIP claim payments (including building and contents) over \$5,000 each and the cumulative amount of such claims payments exceeds \$20,000; or
- (b) For which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

For both (a) and (b) above, at least two of the referenced claims must have occurred within any ten-year period and must be greater than 10 days apart.

Purpose

To reduce or eliminate claims under the NFIP through project activities that will result in the greatest savings to the National Flood Insurance Fund (NFIF).

Federal / Non-Federal cost share

75/25%; up to 90% federal cost-share funding for projects approved in states, territories and federally-recognized Indian tribes with FEMA-approved Standard or Enhanced Mitigation Plans or Indian tribal plans that include a strategy for mitigating existing and future SRL properties.

**For further information all of these programs, please refer to
the new FEMA Hazard Mitigation Assistance Guidance:**

http://www.fema.gov/media-library-data/1424983165449-38f5dfc69c0bd4ea8a161e8bb7b79553/HMA_Guidance_022715_508.pdf

APPENDIX C: THE EXTENT OF NATURAL HAZARDS

Hazards indicated with an asterisk * are included in this plan.

***SEVERE WINTER WEATHER**

Ice and snow events typically occur during the winter months and can cause loss of life, property damage and tree damage.

Snowstorms

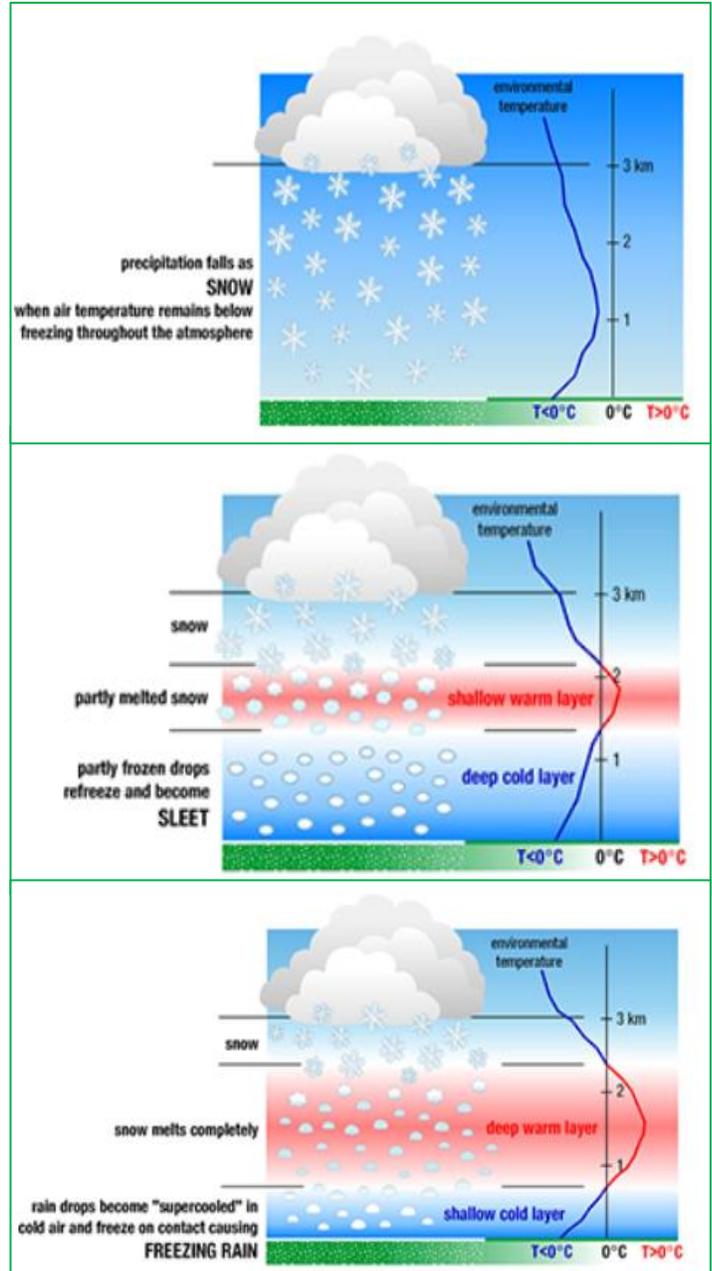
A winter storm can range from moderate snow to blizzard conditions. Blizzard conditions are considered blinding wind-driven snow over 35 mph that lasts several days. A severe winter storm deposits four or more inches of snow during a 12-hour period or six inches of snow during a 24-hour period.

Sleet

Snowflakes melt as they fall through a small band of warm air and later refreeze when passing through a wider band of cold air. These frozen rain drops then fall to the ground as “sleet”.

Freezing Rain & Ice Storms

Snowflakes melt completely as they fall through a warm band of air then fall through a shallow band of cold air close to the ground to become “supercooled”. These supercooled raindrops instantly freeze upon contact with the ground and anything else that is below 32 degrees Fahrenheit. This freezing creates accumulations of ice on roads, trees, utility lines and other objects resulting in what we think of as an “ice storm”. “Ice coating at least one-fourth inch in thickness is heavy enough to damage trees, overhead wires and similar objects.”³¹



*Types of Severe Winter Weather
NOAA – National Severe Storms Laboratory*

³¹ NOAA, National Severe Storms Laboratory, <https://www.nssl.noaa.gov/education/svrwx101/winter/types/>

The Sperry-Piltz Ice Accumulation Index (SPIA) (below) is designed to help utility companies better prepare for predicated ice storms.³²

The Sperry-Piltz Ice Accumulation Index, or "SPIA Index" – Copyright, February, 2009

ICE DAMAGE INDEX	* AVERAGE NWS ICE AMOUNT (in inches) <small>*Revised-October, 2011</small>	WIND (mph)	DAMAGE AND IMPACT DESCRIPTIONS
0	< 0.25	< 15	Minimal risk of damage to exposed utility systems; no alerts or advisories needed for crews, few outages.
1	0.10 - 0.25	15 - 25	Some isolated or localized utility interruptions are possible, typically lasting only a few hours. Roads and bridges may become slick and hazardous.
	0.25 - 0.50	> 15	
2	0.10 - 0.25	25 - 35	Scattered utility interruptions expected, typically lasting 12 to 24 hours. Roads and travel conditions may be extremely hazardous due to ice accumulation.
	0.25 - 0.50	15 - 25	
	0.50 - 0.75	< 15	
3	0.10 - 0.25	>= 35	Numerous utility interruptions with some damage to main feeder lines and equipment expected. Tree limb damage is excessive. Outages lasting 1 - 5 days.
	0.25 - 0.50	25 - 35	
	0.50 - 0.75	15 - 25	
	0.75 - 1.00	< 15	
4	0.25 - 0.50	>= 35	Prolonged & widespread utility interruptions with extensive damage to main distribution feeder lines & some high voltage transmission lines/structures. Outages lasting 5 - 10 days.
	0.50 - 0.75	25 - 35	
	0.75 - 1.00	15 - 25	
	1.00 - 1.50	< 15	
5	0.50 - 0.75	>= 35	Catastrophic damage to entire exposed utility systems, including both distribution and transmission networks. Outages could last several weeks in some areas. Shelters needed.
	0.75 - 1.00	>= 25	
	1.00 - 1.50	>= 15	
	> 1.50	Any	

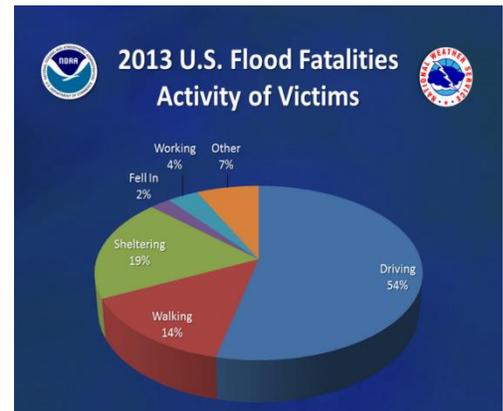
(Categories of damage are based upon combinations of precipitation totals, temperatures and wind speeds/directions.)

***INLAND FLOODING**

General Flooding Conditions

Floods are defined as a temporary overflow of water onto lands that are not normally covered by water. Flooding results from the overflow of major rivers and tributaries, storm surges or inadequate local drainage. Floods can cause loss of life, property damage, crop/livestock damage and water supply contamination. Floods can also disrupt travel routes on roads and bridges.

Inland floods are most likely to occur in the spring due to the increase in rainfall and melting of snow; however, floods can occur at any time of the year. A sudden thaw in the winter or a major downpour in the summer can cause flooding because there is suddenly a lot of water in one place with nowhere to go; warm temperatures and heavy rains cause rapid snowmelt producing prime conditions for flooding. In addition, rising waters in early spring often breaks ice into chunks that float downstream and pile up, causing flooding behind them. Small rivers and streams pose special flooding risks because they are easily blocked by jams. Ice in riverbeds and against structures presents a significant flooding threat to bridges, roads and the surrounding lands.



³² The Weather Channel, <http://www.weather.com/news/weather-winter/rating-ice-storms-damage-sperry-piltz-20131202>

Flooding (Dam Failure)

Flooding as a result of dam failure can be small enough to only affect the immediate area of the dam, or large enough to cause catastrophic results to cities, towns and human life that is below the dam. The extent of flooding depends largely on the size of the dam, the amount of water that is being held by the dam, the size of the breach, the amount of water flow from the dam and the amount of human habitation that is downstream.

A “Dam” means any artificial barrier, including appurtenant works, which impounds or diverts water, and which has a height of 4 feet or more, or a storage capacity of 2 acre-feet or more, or is located at the outlet of a great pond^[1]. A dam failure occurs when water overtops the dam, or there is structural failure of the dam which causes there to be a breach and an unintentional release of water. Dams are classified in the following manner³³:

Classification	Description	Inspection Intervals
Non-Menace	A dam that is not a menace because it is in a location and of a size that failure or misoperation of the dam would not result in probable loss of life or loss to property The dam must be less than six feet in height if the storage capacity is greater than 50 acre-feet or less than 25 feet in height if it has a storage capacity of 15-50 acre-feet.	Every 6 years
Low Hazard	A dam that has a low hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no possible loss of life, low economic loss to structures or property, structural damage to a town or city road or private road accessing property other than the dam owner's that could render the road impassable or otherwise interrupt public safety services, the release of liquid industrial, agricultural, or commercial wastes, septage, or contained sediment if the storage capacity is less two-acre-feet and is located more than 250 feet from a water body or water course, and/or reversible environmental losses to environmentally-sensitive sites.	Every 6 years
Significant Hazard	A dam that has a significant hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in no probable loss of lives; however, there would be major economic loss to structures or property, Structural damage to a Class I or Class II road that could render the road impassable or otherwise interrupt public safety services, major environmental pro public health losses including one or more of the following: Damages to a public water system (RSA 485:1-a, XV) which will take longer than 48 hours to repair, the release of liquid industrial, agricultural, or commercial wastes, septage, sewage, or contaminated sediments if the storage capacity is 2 acre-feet or more; or damage to an environmentally-sensitive site that does not meet the definition of reversible environmental losses.	Every 4 years
High Hazard	A dam that has a high hazard potential because it is in a location and of a size that failure or misoperation of the dam would result in probable loss of human life as well as a result of; water levels and velocities causing the structural failure of a foundation of a habitable residential structure or commercial or industrial structure which is occupied under normal conditions; water levels rising above the first floor elevation of a habitable residential structure or a commercial or industrial structure, which is occupied under normal conditions when the rise due to a dam failure is greater than one foot; structural damage to an interstate highway, which could render the roadway impassable or otherwise interrupt public safety services; the release of a quantity and concentration of material, which qualify as “hazardous waste” as defined by RSA 147-A:2 VII; or any other circumstance that would more likely than not cause one or more deaths.	Every 2 years

^[1] NH DES http://des.nh.gov/organization/divisions/water/dwgb/wrpp/documents/primer_chapter11.pdf

³³ <http://des.nh.gov/organization/commissioner/pip/factsheets/db/documents/db-15.pdf>

Flooding (local, road erosion)

Heavy rain, rapid snowmelt and stream flooding often cause culverts to be overwhelmed and roads to wash out. Today, with changes in land use, aging roads, designs that are no longer effective and undersized culverts, the risk of flooding is a serious concern. Inadequate and aging stormwater drainage systems create local flooding on both asphalt and gravel roads.

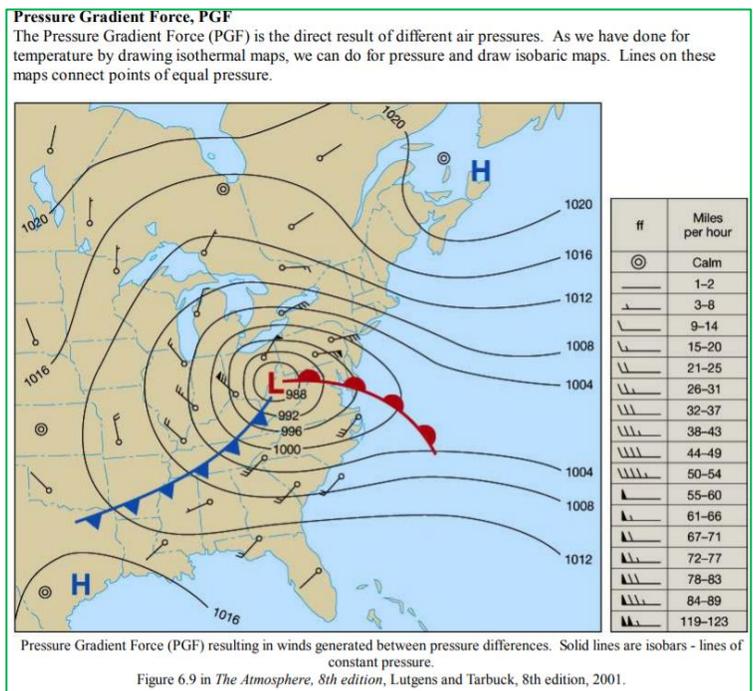
Flooding (Riverine)

Floodplains are usually located in lowlands near rivers and flood on a regular basis. The term 100-year flood does not mean that flood will occur once every 100 years. It is a statement of probability that scientists and engineers use to describe how one flood compares to others that are likely to occur. It is more accurate to use the phrase “1% annual chance flood”. Flooding is often associated with hurricanes, heavy rains, ice jams and rapid snowmelt in the spring.

***HIGH WIND EVENTS**

Windstorm

As stated by NOAA (National Oceanic & Atmospheric Administration), wind is defined as “The horizontal motion of the air past a given point. Winds begin with differences in air pressures. Those pressures which are higher at one place than another place set up a force pushing from the high pressure toward the low pressure; the greater the difference in pressures, the stronger the force. The distance between the area of high pressure and the area of low pressure also determines how fast the moving air is accelerated. Meteorologists refer to the force that starts the wind flowing as the “pressure gradient force.” High and low pressures are relative. There’s no set number that divides high and low pressure. Wind is used to describe the prevailing direction from which the wind is blowing with the speed given usually in miles per hour or knots.” In addition, NOAA’s issuance of a Wind Advisory takes place when sustained winds reach 25 to 39 mph and/or gusts to 57 mph.^{34 35}



³⁴ NOAA; <http://www.nws.noaa.gov/glossary/index.php?letter=w>

³⁵ Pressure Gradient Force Chart “snipped” from *Air Pressure and Wind*; https://www.weather.gov/media/zhu/ZHU_Training_Page/winds/pressure_winds/pressure_winds.pdf

Tornado

A tornado is a violent windstorm characterized by a twisting, funnel-shaped cloud. Tornadoes develop when cool air overrides a layer of warm air, causing the warm air to rise rapidly. The atmospheric conditions required for the formation of a tornado include great thermal instability, high humidity and the convergence of warm, moist air at low levels with cooler, drier air aloft. Most tornadoes remain suspended in the atmosphere, but if they touch down they become a force of destruction.

Tornadoes produce the most violent winds on earth, at speeds of 280 mph or more. In addition, tornadoes can travel at a forward speed of up to 70 mph. Damage paths can be in excess of one mile wide and 50 miles long. Violent winds and debris slamming into buildings cause the most structural damage.

The Fujita Scale is the standard scale for rating the severity of a tornado as measured by the damage it causes. A tornado is usually accompanied by thunder, lightning, heavy rain and a loud “freight train” noise. In comparison to a hurricane, a tornado covers a much smaller area but can be more violent and destructive.

“Dr. T. Theodore Fujita developed the Fujita Tornado Damage Scale (F-Scale) to provide estimates of tornado strength based on damage surveys. Since it's practically impossible to make direct measurements of tornado winds, an estimate of the winds based on damage is the best way to classify a tornado. The new Enhanced Fujita Scale (EF-Scale) addresses some of the limitations identified by meteorologists and engineers since the introduction of the Fujita Scale in 1971. The new scale identifies 28 different free standing structures most affected by tornadoes taking into account construction quality and maintenance. The range of tornado intensities remains as before, zero to five, with 'EF-0' being the weakest, associated with very little damage and 'EF-5' representing complete destruction, which was the case in Greensburg, Kansas, on May 4th, 2007, the first tornado classified as 'EF-5'. The EF scale was adopted on February 1, 2007.”³⁶ The chart (right), adapted from wunderground.com, shows a comparison of the Fujita Scale to the Enhanced Fujita Scale.

EF SCALE	OLD F-SCALE	TYPICAL DAMAGE
EF-0 (65-85mph)	F0 (65-73 mph)	Light damage. Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over.
EF-1 (86-110 mph)	F1 (74-112 mph)	Moderate damage. Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.
EF-2 (111-135 mph)	F2 (113-157 mph)	Considerable damage. Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes completely destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.
EF-3 (136-165 mph)	F3 (158-206 mph)	Severe damage. Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.
EF-4 (166-200 mph)	F4 (207-260 mph)	Devastating damage. Well-constructed houses and whole frame houses completely leveled; cars thrown and small missiles generated.
EF-5 (>200 mph)	F5 (261-318 mph)	Incredible damage. Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (109 yards); high-rise buildings have significant structural deformation; incredible phenomena will occur.
EF No rating	F6-F12 (319 mph to speed of sound)	Inconceivable damage. Should a tornado with the maximum wind speed in excess of EF5 occur, the extent and types of damage may not be conceived. A number of missiles such as iceboxes, water heaters, storage tanks, automobiles, etc. will create serious secondary damage on structures.

³⁶ Enhance Fujita Scale, http://www.wunderground.com/resources/severe/fujita_scale.asp

Downburst

A downburst is a strong downdraft that causes damaging winds on or near the ground, according to NOAA. Not to be confused with downburst, the term "microburst" describes the size of the downburst. A comparison of a microburst and the larger macroburst shows that both can cause extreme winds.

A microburst is a downburst with winds extending 2 ½ miles or less, lasting 5 to 15 minutes and causing damaging winds as high as 168 MPH. A macroburst is a downburst with winds extending more than 2 ½ miles lasting 5 to 30 minutes. Damaging winds, causing widespread, tornado-like damage, could be as high as 134 MPH.³⁷

Below is the Beaufort Wind Scale, showing expected damage based on wind (knots), developed in 1805 by Sir Francis Beaufort of England and posted on NOAA’s Storm Prediction Center website.³⁸

Force	Wind (Knots)	WMO Classification	Appearance of Wind Effects	
			On the Water	On Land
0	Less than 1	Calm	Sea surface smooth and mirror-like	Calm, smoke rises vertically
1	1-3	Light Air	Scaly ripples, no foam crests	Smoke drift indicates wind direction, still wind vanes
2	4-6	Light Breeze	Small wavelets, crests glassy, no breaking	Wind felt on face, leaves rustle, vanes bring to move
3	7-10	Gentle Breeze	Large wavelets, crests begin to break, scattered whitecaps	Leaves and small twigs constantly moving, light flags extended
4	11-16	Moderate Breeze	Small waves 1-4 ft. becoming longer, numerous whitecaps	Dust, leaves, and loose paper lifted, small tree branches move
5	17-21	Fresh Breeze	Moderate waves 4-8 ft. taking longer form, many whitecaps, some spray	Small trees in leaf begin to sway
6	22-27	Strong Breeze	Larger waves 8-13 ft., whitecaps common, more spray	Larger tree branches moving, whistling in wires
7	28-33	Near Gale	Sea heaps up, waves 13-20 ft., white foam streaks off breakers	Whole trees moving, resistance felt walking against wind
8	34-40	Gale	Moderately high (13-20 ft.) waves of greater length, edges of crests begin to break into spindrift, foam blown in streaks	Whole trees in motion, resistance felt walking against wind
9	41-47	Strong Gale	High waves (20 ft.), sea begins to roll, dense streaks of foam, spray may reduce visibility	Slight structural damage occurs, slate blows off roofs
10	48-55	Storm	Very high waves (20-30 ft.) with overhanging crests, sea white with densely blown foam, heavy rolling, lowered visibility	Seldom experienced on land, trees broken or uprooted, "considerable structural damage"
11	56-63	Violent Storm	Exceptionally high(30-45 ft.) waves, foam patches cover sea, visibility more reduced	
12	64+	Hurricane	Air filled with foam, waves over 45 ft., sea completely white with driving spray, visibility greatly reduced	

³⁷ NOAA - <http://www.srh.noaa.gov/jetstream/tstorms/wind.html>

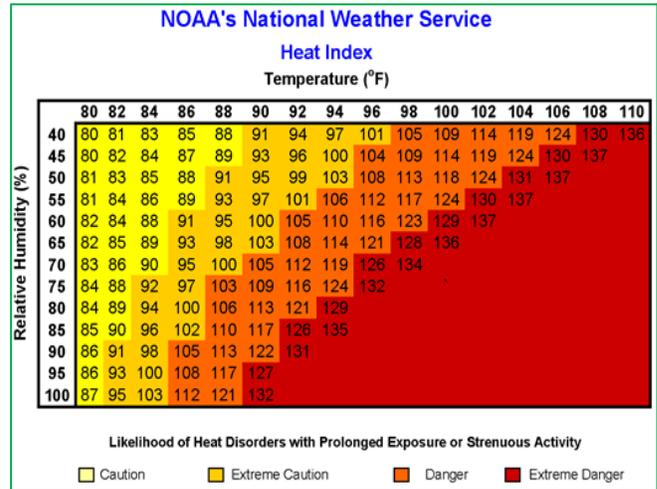
³⁸ NOAA, Storm Prediction Center, <http://www.spc.noaa.gov/faq/tornado/beaufort.html>

***EXTREME TEMPERATURES**

Extreme Heat

A heatwave is a “Prolonged period of excessive heat, often combined with excessive humidity.” Heat kills by pushing the human body beyond its limits. In extreme heat and high humidity, evaporation is slowed, and the body must work extra hard to maintain a normal temperature.

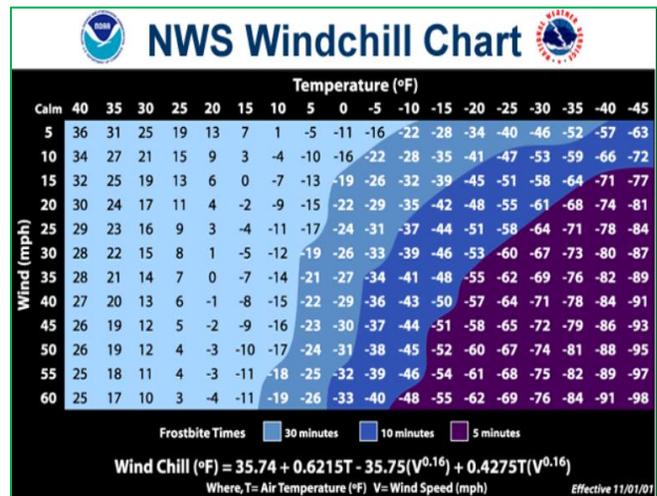
Most heat disorders occur because the victim has been overexposed to heat or has over-exercised for his or her age and physical condition. Older adults, young children and those who are sick or overweight are more likely to succumb to extreme heat.



Conditions that can induce heat-related illnesses include stagnant atmospheric conditions and poor air quality. Consequently, people living in urban areas may be at greater risk from the effects of a prolonged heat wave than those living in rural areas. Also, asphalt and concrete store heat longer and gradually release heat at night, which can produce higher nighttime temperatures known as the "urban heat island effect."³⁹ The chart above explains the likelihood of heat disorders that may result from high heat.⁴⁰

Extreme Cold

What constitutes extreme cold and its effects can vary across different areas of the country. In regions relatively unaccustomed to winter weather, near freezing temperatures are considered “extreme cold.” Whenever temperatures drop decidedly below normal and as wind speed increases, heat can leave your body more rapidly; these weather-related conditions may lead to serious health problems. Extreme cold is a dangerous situation that can bring on health emergencies in susceptible people without shelter or who are stranded, or who live in a home that is poorly insulated or without heat.⁴¹ The National Weather Service Chart (to the right) shows windchill as a result of wind and temperature.⁴²



³⁹ NOAA, Index/Heat Disorders; <http://www.srh.noaa.gov/ssd/html/heatwv.htm>

⁴⁰ NOAA; <http://www.nws.noaa.gov/os/heat/index.shtml>

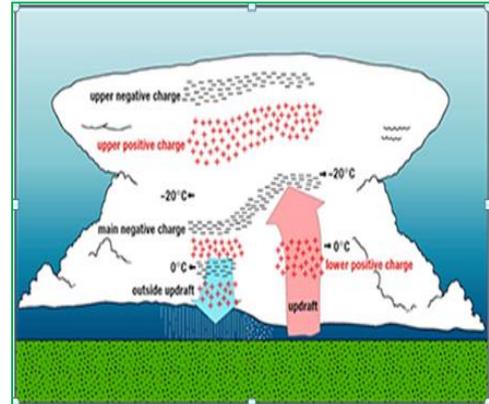
⁴¹ CDC; <http://www.bt.cdc.gov/disasters/winter/guide.asp>

⁴² National Weather Service; <http://www.nws.noaa.gov/om/windchill/>

LIGHTNING*Lightning**

As stated by the NOAA National Severe Storms Laboratory (NSSL) “Lightning is a giant spark of electricity in the atmosphere between clouds, the air, or the ground. In the early stages of development, air acts as an insulator between the positive and negative charges in the cloud and between the cloud and the ground. When the opposite charges build up enough, this insulating capacity of the air breaks down, and there is a rapid discharge of electricity that we know as lightning. The flash of lightning temporarily equalizes the charged regions in the atmosphere until the opposite charges build up again.”⁴³

Thunder, a result of lightning, is created when the “lightning channel heats the air to around 18,000 degrees Fahrenheit...”⁴⁴ thus causing the rapid expansion of the air and the sounds we hear as thunder. Although thunder that is heard during a storm cannot hurt you, the lightning that is associated with the thunder can not only strike people but also strike homes, out-buildings, grass and trees, sparking disaster. Wildfires and structure loss are at a high risk during severe lightning events.



“A conceptual model shows the electrical charge distribution inside deep convection (thunderstorms), developed by NSSL and university scientists. In the main updraft (in and above the red arrow), there are four main charge regions. In the convective region but outside the out draft (in and above the blue arrow), there are more than four charge regions.” - NOAA

Although thunderstorms and their associated lightning can occur any time of year, in New England, they are most likely to occur in the summer months and during the late afternoon or early evening hours; they may even occur during a winter snowstorm. Trees, tall buildings and mountains are often the targets of lightning because their tops are closer to the cloud; however, lightning is unpredictable and does not always strike the tallest thing in the area.

“Lightning strikes the ground somewhere in the U.S. nearly every day of the year. Thunderstorms and lightning occur most commonly in moist warm climates. Data from the National Lightning Detection Network shows that over the continental U.S. an average of 20,000,000 cloud-to-ground flashes occur every year. Around the world, lightning strikes the ground about 100 times each second, or 8 million times a day.

In general, lightning decreases across the U.S. mainland toward the northwest. Over the entire year, the highest frequency of cloud-to-ground lightning is in Florida between Tampa and Orlando. This is due to the presence, on many days during the year, of a large moisture content in the atmosphere at low levels (below 5,000 feet), as well as high surface temperatures that produce strong sea breezes along the Florida coasts. The western mountains of the U.S. also produce strong upward motions and contribute to frequent cloud-to-ground lightning. There are also high frequencies along the Gulf of Mexico coast, the Atlantic coast and in the southeast United States. US Regions along the Pacific west coast have the least cloud-to-ground lightning.”⁴⁵

⁴³ NOAA National Severe Storms Laboratory, <https://www.nssl.noaa.gov/education/svrwx101/lightning>

⁴⁴ Ibid

⁴⁵ Ibid

Lightning Activity Level (LAL) Grid		
The lightning activity level is a common parameter that is part of fire weather forecasts nationwide. LAL is a measure of the amount of lightning activity using values 1 to 6 where:		
LAL	Cloud & Storm Development	Lightning Strikes 15 Minutes
1	No thunderstorms	-
2	Cumulus clouds are common but only a few reach the towering cumulus stage. A single thunderstorm must be confirmed in the observation area. The clouds produce mainly virga, but light rain will occasionally reach the ground. Lightning is very infrequent.	1-8
3	Towering cumulus covers less than two-tenths of the sky. Thunderstorms are few, but two to three must occur within the observation area. Light to moderate rain will reach the ground, and lightning is infrequent.	9-15
4	Towering cumulus covers two to three-tenths of the sky. Thunderstorms are scattered and more than three must occur within the observation area. Moderate rain is common and lightning is frequent.	16-25
5	Towering cumulus and thunderstorms are numerous. They cover more than three-tenths and occasionally obscure the sky. Rain is moderate to heavy and lightning is frequent and intense.	>25
6	Similar to LAL 3 except thunderstorms are dry.	

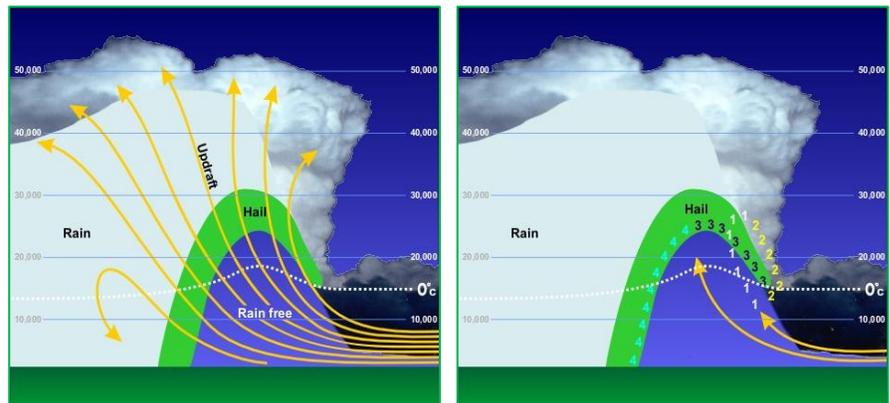
<http://www.prh.noaa.gov/hnl/pages/LAL.php>

Hailstorm

Hailstones are balls of ice that grow as they're held up by winds, known as updrafts that blow upwards in thunderstorms. The updrafts carry droplets of supercooled water, water at a below-freezing temperature that is not yet ice. The supercooled water droplets freeze into balls of ice and grow to become hailstones. The faster the updraft, the bigger the stones can grow. Most hailstones are smaller in diameter than a dime, but stones weighing more than a pound have been recorded. "The largest hailstone recovered in the US fell in Vivian, SD on June 23, 2010 with a diameter of 8 inches and a circumference of 18.62 inches. It weighed 1 lb. 15 oz."⁴⁶

Dime/Penny	0.75	
Nickel	0.88	
Quarter	1.00	
Half Dollar	1.25	
Ping Pong	1.50	
Golf Ball	1.75	
Hen Egg	2.00	
Tennis Ball	2.50	
Baseball	2.75	
Tea Cup	3.00	
Grapefruit	4.00	
Softball	4.50	

Details of how hailstones grow are complicated, but the results are irregular balls of ice that can be as large as baseballs. The chart above shows the relative size differences and a common way to "measure" the size of hail based on diameter.⁴⁷ The charts to the right show how hail is formed.⁴⁸



⁴⁶ NOAA National Severe Storms Laboratory; <https://www.nssl.noaa.gov/education/svrwx101/hail/>

⁴⁷ <http://www.pinterest.com/pin/126171227030590678/>

⁴⁸ <http://oceanservice.noaa.gov/education/yos/resource/JetStream/tstorms/hail.htm#hail>

***WILDFIRES**

As stated by the National Wildfire Coordinating Group (NWCG), wildfires are designated in seven categories as seen in the top chart to the right.⁴⁹ For the purpose of statistical analysis, the US Forest Service recognizes the cause of fires according to the bottom chart to the right:⁵⁰

The definition according to the International Wildland-Urban Interface Code of wildfire is “an uncontrolled fire spreading through vegetative fuels exposing and possibly consuming structures”. In addition, the IWUIC goes on to define the wildland urban interface area as “that geographical area where structures and other human development meets or intermingles with wildland or vegetative fuels.”⁵¹

There are two main potential losses with a wildfire: the forest itself and the threat to the built-up human environment (the structures within the WUI). In many cases, the only time it is feasible for a community to control wildfire is when it threatens the built-up human environment.

Class	Aces Burned
Class A	0 to .25 acres
Class B	.26 to 9 acres
Class C	10 to 99 acres
Class D	100 to 299 acres
Class E	300 to 999 acres
Class F	1,000 to 4,999 acres
Class G	5,000 acres or more
Code	Statistical Cause
1	Lightning
2	Equipment Use
3	Smoking
4	Campfire
5	Debris Burning
6	Railroad
7	Arson
8	Children
9	Miscellaneous

***TROPICAL & POST-TROPICAL CYCLONES**

Cyclones (Hurricanes)

A hurricane is a tropical cyclone in which winds reach speeds of 74 miles per hour or more and blow in a large spiral around a relatively calm center. The eye of the storm is usually 20-30 miles wide, and the storm may extend over 400 miles. High winds are a primary cause of hurricane-inflicted loss of life and property damage.

“The Saffir-Simpson Hurricane Wind Scale” (on the following page⁵²) is a 1 to 5 rating based on a hurricane's sustained wind speed. This scale estimates potential property damage. Hurricanes reaching Category 3 and higher are considered major hurricanes because of their potential for significant loss of life and damage. Category 1 and 2 storms are still dangerous and require preventative measures. In the western North Pacific, the term “super typhoon” is used for tropical cyclones with sustained winds exceeding 150 mph.”⁵³

Flooding is often caused by the coastal storm surge of the ocean and torrential rains, both of which may accompany a hurricane; these floods can result in loss of lives and property.

Post-Tropical Cyclones

A tropical depression becomes a tropical storm when its maximum sustained winds are between 39-73 mph. Although tropical storms have winds of less than 74 miles per hour, like hurricanes, they can do significant damage. The damage most felt by tropical storms is from the torrential rains they produce, which cause rivers and streams to flood and overflow their banks.

⁴⁹ <http://www.nwcg.gov/pms/pubs/glossary/s.htm>
⁵⁰ https://www.fs.fed.us/cgi-bin/Directives/get_dirs/fsh?5109.14
⁵¹ International Wildland-Urban Interface Code, 2012, International Code Council, Inc.
⁵² National Hurricane Center; <http://www.nhc.noaa.gov/aboutsshws.php>
⁵³ National Hurricane Center, NOAA; <http://www.nhc.noaa.gov/aboutsshws.php>

Rainfall from tropical storms has been reported at rates of up to 6 inches per hour; 43 inches of rain in a 24 hour period was reported in Alvin, TX as a result of Tropical Storm Claudette.⁵⁴

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph 64-82 kt. 119-153 km/h	Very dangerous winds will produce some damage: Well-constructed frame homes could have damage to roof, shingles, and vinyl siding and gutters. Large branches of trees will snap and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110 mph 83-95 kt. 154-177 km/h	Extremely dangerous winds will cause extensive damage: Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3 (major)	111-129 mph 96-112 kt. 178-208 km/h	Devastating damage will occur: Well-built frame homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4 (major)	130-156 mph 113-136 kt. 209-251 km/h	Catastrophic damage will occur: Well-built frame homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.
5 (major)	157 mph or higher 137 kt. or higher 252 km/h or higher	Catastrophic damage will occur: A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

***EARTHQUAKES**

An earthquake is a rapid shaking of the earth caused by the breaking and shifting of rock beneath the earth’s surface. Earthquakes can cause buildings and bridges to collapse, disrupt gas, electric and phone lines and often cause landslides, flash floods, fires and avalanches. Larger earthquakes usually begin with slight tremors but rapidly take the form of one or more violent shocks and end in vibrations of gradually diminishing force called aftershocks. The underground point of origin of an earthquake is called its focus; the point on the surface directly above the focus is the epicenter. The magnitude and intensity of an earthquake is widely determined by the use of two scales, the more commonly used Richter scale (measures strength or magnitude) and the Mercalli Scale (measures intensity or severity). The chart to the right shows the two scales relative to one another. The Richter Scale measures earthquakes starting at one as the lowest with each successive unit being about ten times stronger and more severe than the previous one.⁵⁵

Four earthquakes occurred in New Hampshire between 1924-1989, having a magnitude of 4.2 or more. Two of these occurred in Ossipee, one west of Laconia and one near the Quebec border. It is well documented that fault lines are running throughout New Hampshire, but high magnitude earthquakes have not been frequent in NH history.

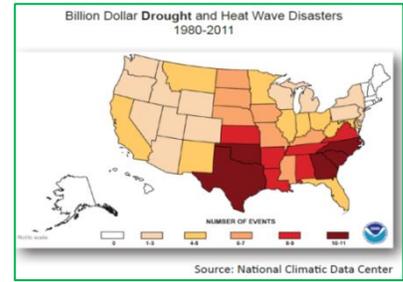
Modified Mercalli Scale		Richter Magnitude Scale
I	Detected only by sensitive instruments	1.5
II	Felt by few persons at rest, especially on upper floors; delicately suspended objects may swing	2
III	Felt noticeably indoors, but not always recognized as earthquake; standing autos rock slightly, vibration like passing truck	2.5
IV	Felt indoors by many, outdoors by few, at night some may awaken; dishes, windows, doors disturbed; autos rock noticeably	3
V	Felt by most people; some breakage of dishes, windows, and plaster; disturbance of tall objects	3.5
VI	Felt by all, many frightened and run outdoors; falling plaster and chimneys, damage small	4
VII	Everybody runs outdoors; damage to buildings varies depending on quality of construction; noticed by drivers of autos	4.5
VIII	Panel walls thrown out of frames; fall of walls, monuments, chimneys; sand and mud ejected; drivers of autos disturbed	5
IX	Buildings shifted off foundations, cracked, thrown out of plumb; ground cracked; underground pipes broken	5.5
X	Most masonry and frame structures destroyed; ground cracked, rails bent, landslides	6
XI	Few structures remain standing; bridges destroyed, fissures in ground, pipes broken, landslides, rails bent	6.5
XII	Damage total; waves seen on ground surface, lines of sight and level distorted, objects thrown up in air	7

⁵⁴ http://www.wpc.ncep.noaa.gov/research/mcs_web_test_test_files/Page1637.htm

⁵⁵ Modified Mercalli Scale/Richter Scale Chart; MO DNR, http://www.dnr.mo.gov/geology/geosrv/geores/richt_mercalli_relation.htm

***DROUGHT**

A drought is defined as a long period of abnormally low precipitation, especially one that adversely affects the growing season or living conditions of plants and animals. Droughts are rare in New Hampshire. They generally are not as damaging and disruptive as floods and are more difficult to define. The effect of drought is indicated through measurements of soil moisture, groundwater levels and streamflow.



However, not all of these indicators will be minimal during a drought. For example, frequent minor rainstorms can replenish the soil moisture without raising groundwater levels or increasing streamflow. Low stream flow also correlates with low groundwater levels because groundwater discharge to streams and rivers maintains streamflow during extended dry periods. Low streamflow and low groundwater levels commonly cause diminished water supply.

The US Drought Monitor provides an intensity scale as shown below to indicate the “Category” of drought at any given time. During the peak months of the 2016 drought in New Hampshire, the southern part of the state was in Category D3 or Extreme Drought.

Category	Description	Possible Impacts	Ranges				
			Palmer Drought Severity Index (PDSI)	CPC Soil Moisture Model (Percentiles)	USGS Weekly Streamflow (Percentiles)	Standardized Precipitation Index (SPI)	Objective Drought Indicator Blends (Percentiles)
D0	Abnormally Dry	<ul style="list-style-type: none"> Going into drought: <ul style="list-style-type: none"> short-term dryness slowing planting, growth of crops or pastures Coming out of drought: <ul style="list-style-type: none"> some lingering water deficits pastures or crops not fully recovered 	-1.0 to -1.9	21 to 30	21 to 30	-0.5 to -0.7	21 to 30
D1	Moderate Drought	<ul style="list-style-type: none"> Some damage to crops, pastures Streams, reservoirs, or wells low, some water shortages developing or imminent Voluntary water-use restrictions requested 	-2.0 to -2.9	11 to 20	11 to 20	-0.8 to -1.2	11 to 20
D2	Severe Drought	<ul style="list-style-type: none"> Crop or pasture losses likely Water shortages common Water restrictions imposed 	-3.0 to -3.9	6 to 10	6 to 10	-1.3 to -1.5	6 to 10
D3	Extreme Drought	<ul style="list-style-type: none"> Major crop/pasture losses Widespread water shortages or restrictions 	-4.0 to -4.9	3 to 5	3 to 5	-1.6 to -1.9	3 to 5
D4	Exceptional Drought	<ul style="list-style-type: none"> Exceptional and widespread crop/pasture losses Shortages of water in reservoirs, streams, and wells creating water emergencies 	-5.0 or less	0 to 2	0 to 2	-2.0 or less	0 to 2

<https://droughtmonitor.unl.edu/AboutUSDM/AbouttheData/DroughtClassification.aspx>

***LANDSLIDE & EROSION**

Erosion is the wearing away of lands, such as loss of riverbank, beach, shoreline or dune material. It is measured as the rate of change in the position or displacement of a riverbank or shoreline over a period of time. Short-term erosion typically results from periodic natural events, such as flooding, hurricanes, storm surge and windstorms but may be intensified by human activities. Long-term erosion is a result of multi-year impacts such as repetitive flooding, wave action, sea-level rise, sediment loss, subsidence and climate change. Death and injury are not typically associated with erosion; however, it can destroy buildings and infrastructure.⁵⁶

While no universally accepted standard or scientific scale has been developed for measuring the severity of all landslides, severity can be measured in several other ways:

- Steepness/grade of the Slope (measured as a percent)
- Geographical Area
 - Measured in square feet, square yards, etc.
 - More accurately measured using LiDAR/GIS systems
- Earthquake, either causing the event or caused by the event (measured using the Moment Magnitude Intensity or Mercalli Scale)

There are also multiple types of landslides:

- Falls: A mass detaches from a steep slope or cliff and descends by free-fall, bounding, or rolling
- Topples: A mass tilts or rotates forward as a unit
- Slides: A mass displaces on one or more recognizable surfaces, which may be curved or planar
- Flows: A mass moves downslope with a fluid motion. A significant amount of water may or may not be part of the mass

Like flooding, landslides are unique in how they affect different geographic, topographic, and geologic areas. Therefore, consideration of a multitude of measurements is required to determine the severity of the landslide event.⁵⁷

INFECTIOUS DISEASES**Bacterial & Viral Infections***

There are many organisms that live inside our bodies and on our skin. These organisms are generally harmless and sometimes may even be helpful, they can cause illnesses. Infectious diseases can be transmitted from one person to another, by bites from animals or insects (zoonotic), from the environment or by consuming food or water that has been contaminated. Infectious diseases may be caused by bacteria, viruses, fungi and parasites.⁵⁸

Some of the more common infectious diseases include Lyme disease, HIV/AIDS, Tuberculosis, Rabies, West Nile Virus, Eastern Equine Encephalitis (EEE), Ebola, Avian Flu, Enterovirus D-68, Influenza, Hepatitis A, Zika Virus, Meningitis, Legionella, Sexually Transmitted Diseases (STD), Hepatitis C, Salmonella, SARS and Staph.⁵⁹

⁵⁶ Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013

⁵⁷ State of New Hampshire Multi-Hazard Mitigation Plan Update 2018 & <https://oas.org/dsd/publications/Unit/oea66e/ch10.htm>

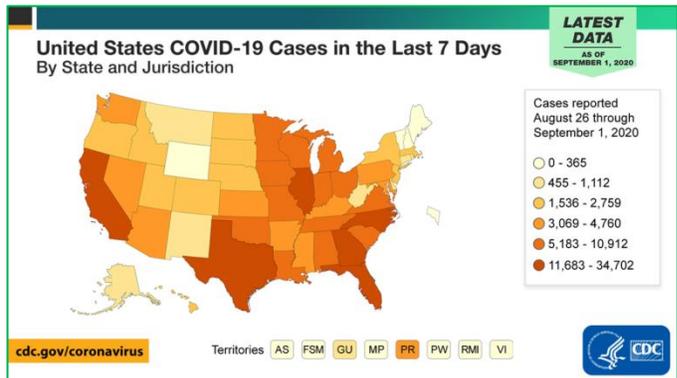
⁵⁸ <https://www.mayoclinic.org/diseases-conditions/infectious-diseases/symptoms-causes/syc-20351173>

⁵⁹ <https://www.dhhs.nh.gov/dphs/cdcs/index.htm>

“Throughout history, millions of people have died of diseases such as bubonic plague or the Black Death, which is caused by *Yersinia pestis* bacteria, and smallpox, which is caused by the variola virus. In recent times, viral infections have been responsible for two major pandemics: the 1918-1919 “Spanish Flu” epidemic that killed 20-40 million people, and the ongoing HIV/AIDS epidemic that killed an estimated 1.5 million people worldwide in 2013 alone.

Bacterial and viral infections can cause similar symptoms such as coughing and sneezing, fever, inflammation, vomiting, diarrhea, fatigue, and cramping – all of which are ways the immune system tries to rid the body of infectious organisms. But bacterial and viral infections are dissimilar in many other important respects, most of them due to the organisms’ structural differences and the way they respond to medications.”⁶⁰

In early 2020, a novel coronavirus emerged in China which then spread worldwide to become the worst pandemic since the 1918 Spanish Flu. Known as COVID-19, this novel coronavirus had infected 26,949,247 people and caused the deaths of 880,771 individuals worldwide as of September 6, 2020. Confirmed cases in the US as of this date was reported to be 6,260,543 with 188,704 deaths.⁶¹ The majority of US residents have been advised to “stay-at-home” by state Governors; businesses have been closed in an effort to “flatten” the rising curve of confirmed cases through mitigation. As of September 2020, mitigation efforts appear to be working; however, nationwide testing and an effective vaccine have not been developed. Stay-at-home orders are expected to remain in place until it is determined by Governors and health experts that a gradual return-to-work can take place. This is an evolving worldwide crisis, effecting millions of workers in the United States and presenting massive economic results. Although most people who have been confirmed with COVID-19 eventually recover, the virus has had a particular impact on the elderly and compromised individuals, particularly those in confined living quarters such as nursing homes and prisons.



Twitter.com/cdcgov, CDC@CDCgov, September 1, 2020

The extent of infectious diseases is generally described by the level and occurrence of a particular disease as follows⁶²:

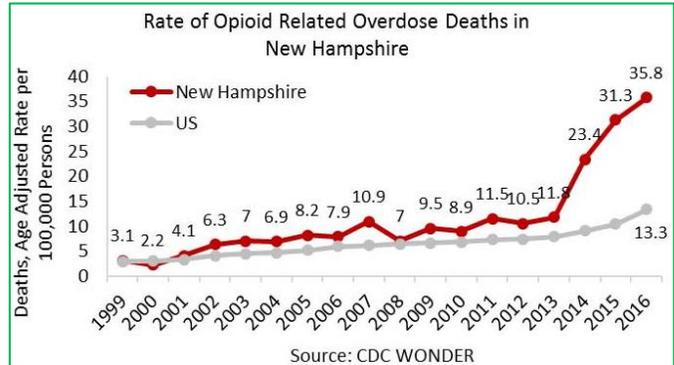
- Endemic Disease with a constant presence or usual prevalence in a population within a geographic area
- Sporadic Disease that occurs infrequently and irregularly
- Hyperendemic Disease that is persistent and has high levels of occurrence
- Epidemic Disease that shows an increase, often sudden, in the number of cases of a disease above what is normally expected in that population in that area
- Outbreak Disease that has the same definition of epidemic, but is often used for a more limited geographic area
- Cluster Refers to an aggregation of cases grouped in place and time that are suspected to be greater than the number expected, even though the expected number may not be known.
- Pandemic An epidemic that has spread over several countries or continents, usually affecting a large number of people

⁶⁰ <https://www.webmd.com/a-to-z-guides/bacterial-and-viral-infections#1>
⁶¹ Johns Hopkins University, <https://coronavirus.jhu.edu/map.html>
⁶² <https://www.cdc.gov/ophss/csels/dsepd/ss1978/lesson1/section11.html>

Opioid Crisis

A revised report by the National Institute of Drug Abuse states, “Every day, more than 130 people in the United States die after overdosing on opioids. The misuse of and addiction to opioids—including prescription pain relievers, heroin, and synthetic opioids such as fentanyl - is a serious national crisis that affects public health as well as social and economic welfare. The Centers for Disease Control and Prevention estimates that the total “economic burden” of prescription opioid misuse alone in the United States is \$78.5 billion a year, including the costs of healthcare, lost productivity, addiction treatment, and criminal justice involvement.”

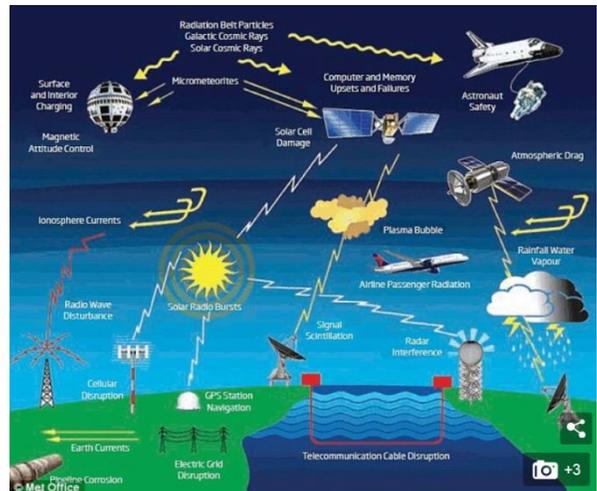
According to the National Institute on Drug Abuse, “New Hampshire has the second highest rate of opioid-related overdose deaths – a rate of 35.8 deaths per 100,000 persons – nearly 3 times higher than the national rate of 13.2 deaths per 100,000. From 2013 through 2016, opioid-related deaths in New Hampshire tripled. This increase was mainly driven by the number of deaths related to synthetic opioids (predominately fentanyl), which increased more than tenfold, from 30 to 363 deaths, during this time.”⁶³ The chart to the right shows the increase in opioid-related overdose deaths in New Hampshire compared to those in the US overall.⁶⁴



SOLAR STORM & SPACE WEATHER

When sudden amounts of stored magnetic energy and ions are discharged from the Sun’s surface, solar flares, high-speed solar wind streams, solar energetic particles and coronal mass ejections (CMEs) are possible. At times, this magnetic energy finds its way to Earth by following the Sun’s magnetic field. Then, upon collision with the Earth’s magnetic field, these charged particles enter the Earth’s upper atmosphere causing Auroras.

Charged magnetic particles can produce their own magnetic field which can disrupt navigation and communication systems and GPS satellites and can potentially produce Geomagnetic Induced Currents (GICs) which can affect the power grid and pipelines. An electromagnetic surge from a solar storm has potential to produce an Electromagnetic Pulse (EMP) which could cause significant damage to infrastructure such as nuclear power plants, banking systems, the electrical grid, sewage treatment facilities, cell phones, landlines and even vehicles. The image above shows the potential impacts from solar storm and space weather.⁶⁵



⁶³ <https://www.drugabuse.gov/drugs-abuse/opioids/opioid-summaries-by-state/new-hampshire-opioid-summary>

⁶⁴ Ibid

⁶⁵ <https://www.dailymail.co.uk/sciencetech/article-3764842/A-solar-storm-destroy-planet-unless-create-massive-magnetic-shield-protect-Earth-warns-expert.html>

Solar Storm & Space Weather Extent⁶⁶

Geomagnetic Storms				
Scale	Description	Effect	Physical Measure	Average Frequency (1 cycle = 11 years)
G 5	Extreme	<p>Power systems: Widespread voltage control problems and protective system problems can occur; some grid systems may experience complete collapse or blackouts. Transformers may experience damage.</p> <p>Spacecraft operations: May experience extensive surface charging, problems with orientation, uplink/downlink and tracking satellites.</p> <p>Other systems: Pipeline currents can reach hundreds of amps, HF (high frequency) radio propagation may be impossible in many areas for one to two days, satellite navigation may be degraded for days, low-frequency radio navigation can be out for hours, and aurora has been seen as low as Florida and southern Texas (typically 40° geomagnetic lat.).</p>	Kp = 9	4 per cycle (4 days per cycle)
G 4	Severe	<p>Power systems: Possible widespread voltage control problems and some protective systems will mistakenly trip out key assets from the grid.</p> <p>Spacecraft operations: May experience surface charging and tracking problems, corrections may be needed for orientation problems.</p> <p>Other systems: Induced pipeline currents affect preventive measures, HF radio propagation sporadic, satellite navigation degraded for hours, low-frequency radio navigation disrupted, and aurora has been seen as low as Alabama and northern California (typically 45° geomagnetic lat.).</p>	Kp = 8, including a 9-	100 per cycle (60 days per cycle)
G 3	Strong	<p>Power systems: Voltage corrections may be required; false alarms triggered on some protection devices.</p> <p>Spacecraft operations: Surface charging may occur on satellite components, drag may increase on low-Earth-orbit satellites, and corrections may be needed for orientation problems.</p> <p>Other systems: Intermittent satellite navigation and low-frequency radio navigation problems may occur, HF radio may be intermittent, and aurora has been seen as low as Illinois and Oregon (typically 50° geomagnetic lat.).</p>	Kp = 7	200 per cycle (130 days per cycle)
G 2	Moderate	<p>Power systems: High-latitude power systems may experience voltage alarms; long-duration storms may cause transformer damage.</p> <p>Spacecraft operations: Corrective actions to orientation may be required by ground control; possible changes in drag affect orbit predictions.</p> <p>Other systems: HF radio propagation can fade at higher latitudes, and aurora has been seen as low as New York and Idaho (typically 55° geomagnetic lat.).</p>	Kp = 6	600 per cycle (360 days per cycle)
G 1	Minor	<p>Power systems: Weak power grid fluctuations can occur.</p> <p>Spacecraft operations: Minor impact on satellite operations possible.</p> <p>Other systems: Migratory animals are affected at this and higher levels; aurora is commonly visible at high latitudes (northern Michigan and Maine).</p>	Kp = 5	1700 per cycle (900 days per cycle)

Solar Radiation Storms				
Scale	Description	Effect	Physical Measure (Flux level of >=10 MeV particles)	Average Frequency (1 cycle = 11 years)
S 5	Extreme	<p>Biological: Unavoidable high radiation hazard to astronauts on EVA (extra-vehicular activity); passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk.</p> <p>Satellite operations: Satellites may be rendered useless, memory impacts can cause loss of control, may cause serious noise in image data, star-trackers may be unable to locate sources; permanent damage to solar panels possible.</p> <p>Other systems: Complete blackout of HF (high frequency) communications possible through the polar regions, and position errors make navigation operations extremely difficult.</p>	10 ⁵	Fewer than 1 per cycle
S 4	Severe	<p>Biological: Unavoidable radiation hazard to astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk.</p> <p>Satellite operations: May experience memory device problems and noise on imaging systems; star-tracker problems may cause orientation problems, and solar panel efficiency can be degraded.</p> <p>Other systems: Blackout of HF radio communications through the polar regions and increased navigation errors over several days are likely.</p>	10 ⁴	3 per cycle

⁶⁶ Extent charts taken from <https://www.weather.gov/akq/SpaceWeather>

Solar Radiation Storms				
S 3	Strong	<p>Biological: Radiation hazard avoidance recommended for astronauts on EVA; passengers and crew in high-flying aircraft at high latitudes may be exposed to radiation risk.</p> <p>Satellite operations: Single-event upsets, noise in imaging systems, and slight reduction of efficiency in solar panel are likely.</p> <p>Other systems: Degraded HF radio propagation through the polar regions and navigation position errors likely.</p>	10^{-3}	10 per cycle
S 2	Moderate	<p>Biological: Passengers and crew in high-flying aircraft at high latitudes may be exposed to elevated radiation risk.</p> <p>Satellite operations: Infrequent single-event upsets possible.</p> <p>Other systems: Small effects on HF propagation through the polar regions and navigation at polar cap locations possibly affected.</p>	10^{-2}	25 per cycle
S 1	Minor	<p>Biological: None.</p> <p>Satellite operations: None.</p> <p>Other systems: Minor impacts on HF radio in the polar regions.</p>	10	50 per cycle

Radio Blackout				
Scale	Description	Effect	Physical Measure	Average Frequency (1 cycle = 11 years)
R 5	Extreme	<p>HF Radio: Complete HF (high frequency) radio blackout on the entire sunlit side of the Earth lasting for a number of hours. This results in no HF radio contact with mariners and on route aviators in this sector.</p> <p>Navigation: Low-frequency navigation signals used by maritime and general aviation systems experience outages on the sunlit side of the Earth for many hours, causing loss in positioning. Increased satellite navigation errors in positioning for several hours on the sunlit side of Earth, which may spread into the night side.</p>	$X20 (2 \times 10^{-3})$	Less than 1 per cycle
R 4	Severe	<p>HF Radio: HF radio communication blackout on most of the sunlit side of Earth for one to two hours. HF radio contact lost during this time.</p> <p>Navigation: Outages of low-frequency navigation signals cause increased error in positioning for one to two hours. Minor disruptions of satellite navigation possible on the sunlit side of Earth.</p>	$X10 (10^{-3})$	8 per cycle (8 days per cycle)
R 3	Strong	<p>HF Radio: Wide area blackout of HF radio communication, loss of radio contact for about an hour on sunlit side of Earth.</p> <p>Navigation: Low-frequency navigation signals degraded for about an hour.</p>	$X1 (10^{-4})$	175 per cycle (140 days per cycle)
R 2	Moderate	<p>HF Radio: Limited blackout of HF radio communication on sunlit side, loss of radio contact for tens of minutes.</p> <p>Navigation: Degradation of low-frequency navigation signals for tens of minutes.</p>	$M5 (5 \times 10^{-5})$	350 per cycle (300 days per cycle)
R 1	Minor	<p>HF Radio: Weak or minor degradation of HF radio communication on sunlit side, occasional loss of radio contact.</p> <p>Navigation: Low-frequency navigation signals degraded for brief intervals.</p>	$M1 (10^{-5})$	2000 per cycle (950 days per cycle)

AVALANCHES

According to the National Snow & Ice Data Center “An avalanche is a rapid flow of snow down a hill or mountainside. Although avalanches can occur on any slope given the right conditions, certain times of the year and certain locations are naturally more dangerous than others. Wintertime, particularly from December to April, is when most avalanches tend to happen. However, avalanche fatalities have been recorded for every month of the year.”⁶⁷



“All that is necessary for an avalanche is a mass of snow and a slope for it to slide down...A large avalanche in North America might release 230,000 cubic meters (300,000 cubic yards) of snow. That is the equivalent of 20 football fields filled 3 meters (10 feet) deep with snow. However, such large avalanches are often naturally released, when the snowpack becomes unstable and layers of snow begin to fail. Skiers and recreationalists usually trigger smaller, but often more deadly avalanches.”

North American Public Avalanche Danger Scale			
Avalanche danger is determined by the likelihood, size and distribution of avalanches.			
Danger Level	Travel Advice	Likelihood of Avalanches	Avalanche Size and Distribution
5 Extreme	Avoid all avalanche terrain.	Natural and human-triggered avalanches certain.	Large to very large avalanches in many areas.
4 High	Very dangerous avalanche conditions. Travel in avalanche terrain not recommended.	Natural avalanches likely; human-triggered avalanches very likely.	Large avalanches in many areas; or very large avalanches in specific areas.
3 Considerable	Dangerous avalanche conditions. Careful snowpack evaluation, cautious route-finding and conservative decision-making essential.	Natural avalanches possible; human-triggered avalanches likely.	Small avalanches in many areas; or large avalanches in specific areas; or very large avalanches in isolated areas.
2 Moderate	Heightened avalanche conditions on specific terrain features. Evaluate snow and terrain carefully; identify features of concern.	Natural avalanches unlikely; human-triggered avalanches possible.	Small avalanches in specific areas; or large avalanches in isolated areas.
1 Low	Generally safe avalanche conditions. Watch for unstable snow on isolated terrain features.	Natural and human-triggered avalanches unlikely.	Small avalanches in isolated areas or extreme terrain.

Safe backcountry travel requires training and experience. You control your own risk by choosing where, when and how you travel.

There are three main parts to an avalanche (see image above). The first and most unstable is the “starting zone”, where the snow can “fracture” and slide. “Typical starting zones are higher up on slopes. However, given the right conditions, snow can fracture at any point on the slope.”⁶⁸

The second part is the “avalanche track”, or the downhill path that the avalanche follows. The avalanche is evident where large swaths of trees are missing or where there are large pile-ups of rock, snow, trees and debris at the bottom of an incline.

The third part of an avalanche is the “runout zone”. The runout zone is where the avalanche has come to a stop and left the largest and highest pile of snow and debris.

“Several factors may affect the likelihood of an avalanche, including weather, temperature, slope steepness, slope orientation (whether the slope is facing north or south), wind direction, terrain, vegetation and general snowpack conditions. Different combinations of these factors can create low, moderate, or extreme avalanche conditions. Some of these conditions, such as temperature and snowpack, can change on a daily or hourly basis.”⁶⁹

⁶⁷ Copyright Richard Armstrong, NSIDC, <http://nsidc.org/cryosphere/snow/science/avalanches.html>

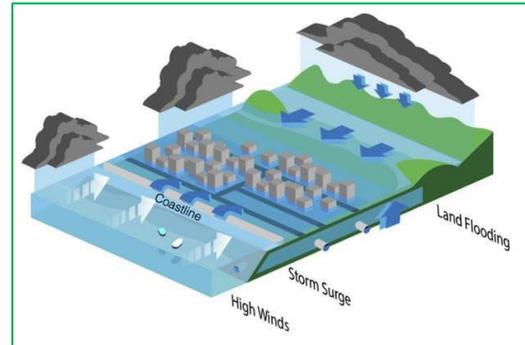
⁶⁸ NSIDC, <http://nsidc.org/cryosphere/snow/science/avalanches.html>; image credit: Betsy Armstrong

⁶⁹ Copyright Richard Armstrong, NSIDC, <http://nsidc.org/cryosphere/snow/science/avalanches.html>

When the possibility of an avalanche is evident, an “avalanche advisory” is issued. This preliminary notification warns hikers, skiers, snowmobilers and responders that conditions may be favorable for the development of avalanches. The chart above shows avalanche danger as determined by likelihood, size & distribution.⁷⁰

COASTAL FLOODING

Coastal areas are particularly susceptible to the hazards such as flooding, erosion, storm surge and sea-level rise as a result of tropical and post-tropical cyclones, heavy rain events and gale-force winds and other natural phenomena. The flooding that results is “determined by a combination of several factors such as storm intensity, forward speed, storm area size, coastline characteristics, angle of approach to the coast, tide height.”⁷¹



The severity of the flooding can vary depending on “both the speed of onset (how quickly the floodwaters rise) and the flood duration. Nor’easters can impact the region for several days and produce storm surge with or without the addition of inland runoff from heavy precipitation.”⁷² As shown in the image above, not only storm surge but also inland flooding can affect the severity of flooding along the shore.⁷³

⁷⁰ http://www.avalanche.org/danger_card.php

⁷¹ NH Multi-hazard Mitigation Plan-2018, page 55

⁷² Ibid

⁷³ Ibid, page 53, “Understanding compound flooding from land and ocean sources”, Theodore Scontras, University of Maine)

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APPENDIX D: NH MAJOR DISASTER & EMERGENCY DECLARATIONS

Major Disaster (DR) & Emergency Declarations (EM)

This list includes one Fire Management Assistance Declaration (FM)
 Declarations are arranged chronologically, the most recent disaster is listed first

Number	Hazard	Date of Event	Counties	Description
DR-4516	Infectious Disease	January 20, 2020 – ongoing	All Ten NH Counties	Major Disaster Declaration DR-4516: The Federal Emergency Management Agency ("FEMA") within the US Department of Homeland Security is giving public notice of its intent to provide assistance to the State of New Hampshire, local and tribal governments, and certain private nonprofit organizations under the major disaster declaration issued by the President on April 3, 2020, as a result of the Coronavirus Disease 2019 ("COVID-19").
EM-3445	Infectious Disease	January 20, 2020 – ongoing	All Ten NH Counties	Emergency Declaration EM-3445: Ten county declaration to provide individual assistance and public assistance as a result of the impact of COVID-19
DR-4457	Severe Storm & Flooding	July 11-12, 2019	Grafton	Major Disaster Declaration DR-4457: The Federal Emergency Management Agency announced a major disaster declaration for a period of severe storms and flooding from July 11-12, 2019 in one New Hampshire County.
DR-4371	Severe Winter Storm & Snowstorm	March 13-14, 2018	Carroll, Strafford & Rockingham	Major Disaster Declaration DR-4371: The Federal Emergency Management Agency announced a major disaster declaration on June 8, 2018 for a period of a severe winter storm from March 13-14, 2018.
DR-4370	Severe Storm & Flooding	March 2-8, 2018	Rockingham	Major Disaster Declaration DR-4370: The Federal Emergency Management Agency announced a major disaster declaration on June 8, 2018 for a period of severe storms and flooding from March 2-8, 2018.
DR-4355	Severe Storms, Flooding	October 29-November 1, 2017	Sullivan, Grafton, Coos, Carroll, Belknap & Merrimack	Major Disaster Declaration DR-4355: The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance is available to the state of New Hampshire to supplement state and local recovery efforts in the areas affected by severe storms and flooding from October 29-November 1, 2017 in five New Hampshire Counties.
DR-4329	Severe Storms, Flooding	July 1-2, 2017	Grafton & Coos	Major Disaster Declaration DR-4329: The Federal Emergency Management Agency (FEMA) announced that federal disaster assistance is available to the state of New Hampshire to supplement state and local recovery efforts in the areas affected by severe storms and flooding from July 1, 2017 to July 2, 2017 in Grafton County
DR-4316	Severe Winter Storm and Snowstorm	March 14-15, 2017	Belknap & Carroll	Major Disaster Declaration DR-4316: Severe winter storm and snowstorm in Belknap & Carroll Counties; disaster aid to supplement state and local recovery efforts.
FM-5123	Forest Fire	April 21-23, 2016	Cheshire	Fire Management Assistance Declaration, FM-5123: Stoddard, NH
DR-4209	Severe Winter Storm and Snowstorm	January 26-28, 2015	Hillsborough, Rockingham & Stafford	Major Disaster Declaration DR-4209: Severe winter storm and snowstorm in Hillsborough, Rockingham and Strafford Counties; disaster aid to supplement state and local recovery efforts.

Number	Hazard	Date of Event	Counties	Description
DR-4139	Severe Storms, Flooding	July 9-10, 2013	Cheshire, Sullivan & Grafton	Major Disaster Declaration DR-4139: Severe storms, flooding, and landslides during the period of June 26 to July 3, 2013 in Cheshire, Sullivan and southern Grafton Counties.
DR-4105	Severe Winter Storm	February 8, 2013	All Ten NH Counties	Major Disaster Declaration DR-4105: Nemo; heavy snow in February 2013.
DR-4095	Hurricane Sandy	October 26-November 8, 2012	Belknap, Carroll, Coos, Grafton, Rockingham & Sullivan	Major Disaster Declaration DR-4095: The declaration covers damage to property from the storm that spawned heavy rains, high winds, high tides and flooding over the period of October 26-November 8, 2012.
EM-3360	Hurricane Sandy	October 26-31, 2012	All Ten NH Counties	Emergency Declaration EM-3360: Hurricane Sandy came ashore in NJ and brought high winds, power outages and heavy rain to NH. Declared in all ten counties in the State of New Hampshire.
DR-4065	Severe Storm & Flooding	May 29-31, 2012	Cheshire	Major Disaster Declaration DR-4065: Severe Storm and Flood Event May 29-31, 2012 in Cheshire County.
DR-4049	Severe Storm & Snowstorm	October 29-30, 2011	Hillsborough & Rockingham	Major Disaster Declaration DR-4049: Severe Storm and Snowstorm Event October 29-30, 2011 in Hillsborough and Rockingham Counties.
EM-3344	Severe Snowstorm	October 29-30, 2011	All Ten NH Counties	Emergency Declaration EM-3344: Severe storm during the period of October 29-30, 2011; all ten counties in the State of New Hampshire. (Snowtober)
DR-4026	Tropical Storm Irene	August 26-September 6, 2011	Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan	Major Disaster Declaration DR-4026: Tropical Storm Irene Aug 26th- Sept 6, 2011 in Carroll, Coos, Grafton, Merrimack, Belknap, Strafford, & Sullivan Counties.
EM-3333	Tropical Storm Irene	August 26-September 6, 2011	All Ten NH Counties	Emergency Declaration EM-3333: Emergency Declaration for Tropical Storm Irene for in all ten counties.
DR-4006	Severe Storm & Flooding	May 26-30, 2011	Coos & Grafton Counties	Major Disaster Declaration DR-4006: May Flooding Event, May 26th-30th 2011 in Coos & Grafton County. (Memorial Day Weekend Storm)
DR-1913	Severe Storms & Flooding	March 14-31, 2010	Hillsborough & Rockingham	Major Disaster Declaration DR-1913: Flooding to two NH counties including Hillsborough and Rockingham counties.
DR-1892	Severe Winter Storm, Rain & Flooding	February 23 - March 3, 2010	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration DR-1892: Flood and wind damage to most of southern NH including six counties; 330,000 homes without power; more than \$2 million obligated by June 2010.
DR-1812	Severe Winter Storm & Ice Storm	December 11-23, 2008	All Ten NH Counties	Major Disaster Declaration DR-1812: Damaging ice storms to entire state including all ten NH counties; fallen trees and large scale power outages; five months after December's ice storm pummeled the region, nearly \$15 million in federal aid had been obligated by May 2009.
EM-3297	Severe Winter Storm	December 11, 2008	All Ten NH Counties	Emergency Declaration EM-3297: Severe winter storm beginning on December 11, 2008.
DR-1799	Severe Storms & Flooding	September 6-7, 2008	Hillsborough	Major Disaster Declaration DR-1799: Severe storms and flooding beginning on September 6, 2008.

Number	Hazard	Date of Event	Counties	Description
DR-1787	Severe Storms & Flooding	July 24-August 14, 2008	Belknap, Carroll & Grafton & Coos	Major Disaster Declaration DR-1787: Severe storms, tornado, and flooding on July 24, 2008.
DR-1782	Severe Storms, Tornado, & Flooding	July 24, 2008	Belknap, Carroll, Merrimack, Strafford & Rockingham	Major Disaster Declaration DR-1782: Tornado damage to several NH counties.
DR-1695	Nor'easter, Severe Storms & Flooding	April 15-23, 2007	All Ten NH Counties	Major Disaster Declaration DR-1695: Flood damages; FEMA & SBA obligated more than \$27.9 million in disaster aid following the April nor'easter. (Tax Day Storm)
DR-1643	Severe Storms & Flooding	May 12-23, 2006	Belknap, Carroll, Grafton, Hillsborough, Merrimack, Rockingham & Strafford	Major Disaster Declaration DR-1643: Flooding in most of southern NH; May 12-23, 2006. (aka: Mother's Day Storm)
DR-1610	Severe Storms & Flooding	October 7-18, 2005	Belknap, Cheshire, Grafton, Hillsborough, Merrimack & Sullivan	Major Disaster Declaration DR-1610: To date, state and federal disaster assistance has reached more than \$3 million to help residents and business owners in New Hampshire recover from losses resulting from the severe storms and flooding in October 2005.
EM-3258	Hurricane Katrina Evacuation	August 29-October 1, 2005	All Ten NH Counties	Emergency Declaration EM-3258: Assistance to evacuees from the area struck by Hurricane Katrina and to provide emergency assistance to those areas beginning on August 29, 2005, and continuing; The President's action makes Federal funding available to the state and all 10 counties of the State of New Hampshire.
EM-3211	Snow	March 11-12, 2005	Carroll, Cheshire, Hillsborough, Rockingham & Sullivan	Emergency Declaration EM-3211: March snowstorm; more than \$2 million has been approved to help pay for costs of the snow removal; Total aid for the March storm is \$2,112,182.01 (Carroll: \$73,964.57; Cheshire: \$118,902.51; Hillsborough: \$710,836; Rockingham: \$445,888.99; Sullivan: \$65,088.53; State of NH: \$697,501.41)
EM-3208	Snow	February 10-11, 2005	Carroll, Cheshire, Coos, Grafton & Sullivan	Emergency Declaration EM-3208: FEMA had obligated more than \$1 million by March 2005 to help pay for costs of the heavy snow and high winds; Total aid for the February storm is \$1,121,727.20 (Carroll: \$91,832.72; Cheshire: \$11,0021.18; Coos: \$11,6508.10; Grafton: \$213,539.52; Sullivan: \$68,288.90; State of NH: \$521,536.78)
EM 3208-002	Snow	January, February, March 2005	Belknap, Carroll, Cheshire, Grafton, Hillsborough, Rockingham, Merrimack, Strafford & Sullivan	Emergency Declaration EM-3208-002: The Federal Emergency Management Agency (FEMA) has obligated more than \$6.5 million to reimburse state and local governments in New Hampshire for costs incurred in three snowstorms that hit the state earlier this year, according to disaster recovery officials. Total aid for all three storms is \$6,892,023.87 (January: \$3,658,114.66; February: \$1,121,727.20; March: \$2,113,182.01)
EM-3207	Snow	January 22-23, 2005	Belknap, Carroll, Cheshire, Grafton, Hillsborough, Rockingham, Merrimack, Strafford & Sullivan	Emergency Declaration EM-3207: More than \$3.5 million has been approved to help pay for costs of the heavy snow and high winds; Total aid for the January storm is \$3,658,114.66 (Belknap: \$125,668.09; Carroll: \$52,864.23; Cheshire: \$134,830.95; Grafton: \$137,118.71; Hillsborough: \$848,606.68; Merrimack: \$315,936.55; Rockingham: \$679,628.10; Strafford: \$207,198.96; Sullivan: \$48,835.80; State of NH: \$1,107,426.59)

Number	Hazard	Date of Event	Counties	Description
EM-3193	Snow	December 6-7, 2003	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack & Sullivan	Emergency Declaration EM-3193: The declaration covers jurisdictions with record and near-record snowfall that occurred over the period of December 6-7, 2003
DR-1489	Severe Storms & Flooding	July 21-August 18, 2003	Cheshire & Sullivan	Major Disaster Declaration DR-1489: Floods stemming from persistent rainfall and severe storms that caused damage to public property occurring over the period of July 21 through August 18, 2003.
EM-3177	Snowstorm	February 17-18, 2003	Cheshire, Hillsborough, Merrimack, Rockingham & Strafford	Emergency Declaration EM-3177: Declaration covers jurisdictions with record and near-record snowfall from the snowstorm that occurred February 17-18, 2003
EM-3166	Snowstorm	March 5-7, 2001	Cheshire, Coos, Grafton, Hillsborough, Merrimack, Rockingham & Strafford	Emergency Declaration EM-3166: Declaration covers jurisdictions with record and near-record snowfall from the late winter storm that occurred March 2001
DR-1305	Tropical Storm Floyd	September 16-18, 1999	Belknap, Cheshire & Grafton	Major Disaster Declaration DR-1305: The declaration covers damage to public property from the storm that spawned heavy rains, high winds and flooding over the period of September 16-18.
DR-1231	Severe Storms & Flooding	June 12-July 2, 1998	Belknap, Carroll, Grafton, Hillsborough, Merrimack & Rockingham	Major Disaster Declaration DR-1231:
DR-1199	Ice Storm	January 7-25, 1998	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, Strafford & Sullivan	Major Disaster Declaration DR-1199:
DR-1144	Severe Storms/Flooding	October 20-23, 1996	Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration DR-1144:
DR-1077	Storms/Floods	October 20-November 15, 1995	Carroll, Cheshire, Coos, Grafton, Merrimack & Sullivan	Major Disaster Declaration DR-1077:
EM-3101	High Winds & Record Snowfall	March 13-17, 1994	All Ten NH Counties	Emergency Declaration EM-3101:
DR-923	Severe Coastal Storm	October 30-31, 1991	Rockingham	Major Disaster Declaration DR-923:
DR-917	Hurricane Bob, Severe Storm	August 18-20, 1991	Carroll, Hillsborough, Rockingham & Strafford	Major Disaster Declaration DR-917:

Number	Hazard	Date of Event	Counties	Description
DR-876	Flooding, Severe Storm	August 7-11, 1990	Belknap, Carroll, Cheshire, Coos, Grafton, Hillsborough, Merrimack, & Sullivan	Major Disaster Declaration DR-876:
DR-789	Severe Storms & Flooding	March 30-April 11, 1987	Carroll, Cheshire, Grafton, Hillsborough, Merrimack, Rockingham, Strafford & Sullivan	Major Disaster Declaration DR-789
DR-771	Severe Storms & Flooding	July 29-August 10, 1986	Cheshire, Hillsborough & Sullivan	Major Disaster Declaration DR-771:
EM-3073	Flooding	March 15, 1979	Coos	Emergency Declaration EM-3073:
DR-549	High Winds, Tidal Surge, Coastal Flooding & Snow	February 16, 1978	All Ten NH Counties	Major Disaster Declaration DR-549: Blizzard of 1978
DR-411	Heavy Rains, Flooding	January 21, 1974	Belknap, Carroll, Cheshire & Grafton	Major Disaster Declaration DR-411:
DR-399	Severe Storms & Flooding	July 11, 1973	All Ten NH Counties	Major Disaster Declaration DR-399:
DR-327	Coastal Storms	March 18, 1972	Rockingham	Major Disaster Declaration DR-327:
DR-11	Forest Fire	July 2, 1953	Carroll	Major Disaster Declaration DR-11:

Source:

Disaster Declarations for New Hampshire

http://www.fema.gov/disasters/grid/state-tribal-government/33?field_disaster_type_term_tid_1=All

APPENDIX E: HAZARD MITIGATION PLANNING – LIST OF ACRONYMS

AAR	After Action Report	HSEM	Homeland Security Emergency Management
ACS	Acute Care Site	HSPD	Homeland Security Presidential Directive
ARC	American Red Cross	IAP	Incident Action Plan
ARES	Amateur Radio Emergency Service	IC	Incident Commander
BFE	Base Flood Elevation	ICC	Incident Command Center
BOCA	Building Officials and Code Administrators	ICS	Incident Command System
CBRNE	Chemical, Biological, Radiological,	JIC	Joint Information Center
CDC	Centers for Disease Control and Prevention	LEOP	Local Emergency Operations Plan
CDP	Center for Domestic Preparedness	MAPS	Mapping and Planning Solutions
CERT	Community Emergency Response Team	MCI	Mass Casualty Incident
CFR	Code of Federal Regulations	MEF	Mission Essential Function
CIKR	Critical Infrastructure & Key Resources	MOU	Memorandum of Understanding
CIP	Capital Improvements Program	NAWAS	National Warning System
COG	Continuity of Government	NEF	National Essential Function
COGCON	Continuity of Government Readiness Conditions	NERF	Non-Emergency Response Facility
COOP	Continuity of Operations	NFIP	National Flood Insurance Program
CPCC	Continuity Policy Coordination Committee	NGVD	National Geodetic Vertical Datum of 1929
CWPP	Community Wildfire Protection Plan	NIMS	National Incident Management System
DBHRT	Disaster Behavioral Health Response Team	NOAA	National Oceanic and Atmospheric Association
DEMD	Deputy Emergency Management Director	NRP	National Response Plan
DES	Department of Environment Services	NSPD	National Security Presidential Directive
DFO	Disaster Field Office	NTAS	National Terrorism Advisory System Nuclear, and Explosive
DHHS	Department of Health and Human Services	NWS	National Weather Service
DHS	Department of Homeland Security	OSI	Office of Strategic Initiatives
DMCR	Disaster Management Central Resource	PA	Public Assistance
DNCR	Department of Natural & Cultural Resources	PDA	Preliminary Damage Assessment
DOD	Department of Defense	PDD	Presidential Decision Directive
DOE	Department of Energy	PIO	Public Information Officer
DOJ	Department of Justice	PMEF	Primary Mission Essential Function
DOT	Department of Transportation	POD	Point of Distribution
DPW	Department of Public Works	PPE	Personal Protective Equipment
DRC	Disaster Recovery Center	PR	Potential Resources
EAS	Emergency Alert System	PSA	Public Service Announcement
EMD	Emergency Management Director	RERP	Radiological Emergency Response Plan
EMS	Emergency Medical Services	RNAT	Rapid Needs Assessment Team
EO	Executive Order	SERT	State Emergency Response Team
EOC	Emergency Operations Center	SITREP	Situation Report (Also SitRep)
EPA	U.S. Environmental Protection Agency	SNS	Strategic National Stockpile
EPZ	Emergency Planning Zone	SOG	Standard Operating Guidelines
ERF	Emergency Response Facility	SOP	Standard Operating Procedures
ERG	Emergency Relocation Group	SPNHF	Society for the Protection of NH Forests
ESF	Emergency Support Functions	UC	Unified Command
FEMA	Federal Emergency Management Agency	USDA-FS	USDA-FS
FIRM	Flood Insurance Rate Map		US Department of Agriculture – Forest Service
FPP	Facilities & Populations to Protect	USGS	United States Geological Society
GIS	Geographic Information System	VOAD	Volunteer Organization Active in Disasters
HazMat	Hazardous Material(s)	WMD	Weapon(s) of Mass Destruction
HFRA	Healthy Forest Restoration Act	WMNF	White Mountain National Forest
HMGP	Hazard Mitigation Grant Program	WUI	Wildland Urban Interface
HSAS	Homeland Security Advisory System		

APPENDIX F: POTENTIAL MITIGATION IDEAS⁷⁴**Drought**

- D1 Assess Vulnerability to Drought Risk
- D2 Monitoring Drought Conditions
- D3 Monitor Water Supply
- D4 Plan for Drought
- D5 Require Water Conservation during Drought Conditions
- D6 Prevent Overgrazing
- D7 Retrofit Water Supply Systems
- D8 Enhance Landscaping & Design Measures
- D9 Educate Residents on Water Saving Techniques
- D10 Educate Farmers on Soil & Water Conservation Practices
- D11 Purchase Crop Insurance

Earthquake

- EQ1.... Adopt & Enforce Building Codes
- EQ2.... Incorporate Earthquake Mitigation into Local Planning
- EQ3.... Map & Assess Community Vulnerability to Seismic Hazards
- EQ4.... Conduct Inspections of Building Safety
- EQ5.... Protect Critical Facilities & Infrastructure
- EQ6.... Implement Structural Mitigation Techniques
- EQ7.... Increase Earthquake Risk Awareness
- EQ8.... Conduct Outreach to Builders, Architects, Engineers and Inspectors
- EQ9.... Provide Information on Structural & Non-Structural Retrofitting

Erosion

- ER1.... Map & Assess Vulnerability to Erosion
- ER2.... Manage Development in Erosion Hazard Areas
- ER3.... Promote or Require Site & Building Design Standards to Minimize Erosion Risk
- ER4.... Remove Existing Buildings & Infrastructure from Erosion Hazard Areas
- ER5.... Stabilize Erosion Hazard Areas
- ER6.... Increase Awareness of Erosion Hazards

Extreme Temperatures

- ET1 Reduce Urban Heat Island Effect
- ET2 Increase Awareness of Extreme Temperature Risk & Safety
- ET3 Assist Vulnerable Populations
- ET4 Educate Property Owners about Freezing Pipes

Hailstorm

- HA1 Locate Safe Rooms to Minimize Damage
- HA2.... Protect Buildings from Hail Damage
- HA3.... Increase Hail Risk Awareness

Landslide

- LS1..... Map & Assess Vulnerability to Landslides
- LS2..... Manage Development in Landslide Hazard Areas
- LS3..... Prevent Impacts to Roadways
- LS4 Remove Existing Buildings & Infrastructure from Landslide

Lightning

- L1..... Protect Critical Facilities
- L2..... Conduct Lightning Awareness Programs

Flood

- F1 Incorporate Flood Mitigation in Local Planning
- F2 Form Partnerships to Support Floodplain Management
- F3 Limit or Restrict Development in Floodplain Areas
- F4 Adopt & Enforce Building Codes and Development Standards
- F5 Improve Stormwater Management Planning
- F6 Adopt Policies to Reduce Stormwater Runoff
- F7 Improve Flood Risk Assessment
- F8 Join or Improve Compliance with NFIP
- F9 Manage the Floodplain beyond Minimum Requirements
- F10 Participate in the CRS
- F11 Establish Local Funding Mechanism for Flood Mitigation
- F12 Remove Existing Structures from Flood Hazard Areas
- F13 Improve Stormwater Drainage System Capacity
- F14 Conduct Regular Maintenance for Drainage Systems & Flood Control Structures
- F15 Elevate or Retrofit Structures & Utilities
- F16 Flood proof Residential & Non-Residential Structures
- F17 Protect Infrastructure
- F18 Protect Critical Facilities
- F19 Construct Flood Control Measures
- F20 Protect & Restore Natural Flood Mitigation Features
- F21 Preserve Floodplains as Open Space
- F22 Increase Awareness of Flood Risk & Safety
- F23 Educate Property Owners about Flood Mitigation Techniques

Severe Wind

- SW1... Adopt & Enforce Building Codes
- SW2... Promote or Require Site & Building Design Standards to Minimize Wind Damage
- SW3... Assess Vulnerability to Severe Wind
- SW4... Protect Power Lines & Infrastructure
- SW5... Retrofit Residential Buildings
- SW6... Retrofit Public Buildings & Critical Facilities
- SW7... Increase Severe Wind Awareness

Severe Winter Weather

- WW1.. Adopt & Enforce Building Codes
- WW2.. Protect Buildings & Infrastructure
- WW3.. Protect Power Lines
- WW4.. Reduce Impacts to Roadways
- WW5.. Conduct Winter Weather Risk Awareness Activities
- WW6.. Assist Vulnerable Populations

Tornado

- T1 Encourage Construction of Safe Rooms
- T2 Require Wind-Resistant Building Techniques
- T2 Conduct Tornado Awareness Activities

⁷⁴ Mitigation Ideas, A Resource for Reducing Risk to Natural Hazards, FEMA, January 2013

Wildfire

- WF1 Map & Assess Vulnerability to Wildfire
- WF2 Incorporate Wildfire Mitigation in the Comprehensive Plan
- WF3 Reduce Risk through Land Use Planning
- WF4 Develop a Wildland Urban Interface Code
- WF5 Require or Encourage Fire-Resistant Construction Techniques
- WF6 Retrofit At-Risk Structure with Ignition-Resistant Materials
- WF7 Create Defensible Space around Structures & Infrastructure
- WF8 Conduct Maintenance to Reduce Risk
- WF9 Implement a Fuels Management Program
- WF10 Participate in the Firewise® Program
- WF11 Increase Wildfire Awareness
- WF12 Educate Property Owners about Wildfire Mitigation Techniques

Multi-Hazards

- MU1 Assess Community Risk
- MU2 Map Community Risk
- MU3 Prevent Development in Hazard Areas
- MU4 Adopt Regulations in Hazard Areas
- MU5 Limit Density in Hazard Areas
- MU6 Integrate Mitigation into Local Planning
- MU7 Strengthen Land Use Regulations
- MU8 Adopt & Enforce Building Codes
- MU9 Create Local Mechanisms for Hazard Mitigation
- MU10 Incentivize Hazard Mitigation
- MU11 Monitor Mitigation Plan Implementation
- MU12 Protect Structures
- MU13 Protect Infrastructure & Critical Facilities
- MU14 Increase Hazard Education & Risk Awareness
- MU15 Improve Household Disaster Preparedness
- MU16 Promote Private Mitigation Efforts

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Woodstock Fire Station

Photo Credit: John Galla

<http://www.firenews.org/nh/w/woodstock/WoodstockNHHQ.jpg>

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